GUIDELINES FOR ARCHITECTS AND ENGINEERS

NOVEMBER 2002

FAIRFAX COUNTY, VIRGINIA

DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL SERVICES

Developed and Issued by:
Building Design Branch
Planning and Design Division
12000 Government Center Parkway, Suite 449
Fairfax, Virginia 22035
(703) 324-5160 (phone)
(703) 324-3941 (fax)
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01000 - GENERAL REQUIREMENTS

DESIGN

A. All interior spaces and associated hardware and exterior construction shall comply with the Americans with Disabilities Act (ADA) requirements.

B. Plans shall provide the following information:

1. Soil boring logs and locations.
2. Building square footage.
3. Site area (acres).
4. U-values for walls, roof/ceiling, door and window.
5. Design roof and floor loads, soil bearing value and structural material strengths.
6. Door, windows and finish schedules; lighting fixture and equipment schedules.
7. Building address.
8. Fairfax County project number, contract number, and signature block.
9. Site Plans for all disciplines shall be at a common scale, and shall be oriented the same way on all plan sheets.

C. Specifications shall follow CSI format and be specific regarding codes intended to be met. Sections of specifications that are performance specifications must be clearly identified as such.

D. Maintenance manuals must be required to include a complete paint schedule for the entire building. Also include specific information for plastic laminate manufacturer and colors, floor tile colors, stains and varnishes, ceiling tile, ceramic tile and all hardware model numbers. Include brand names and specifics needed for ordering from manufacturer. These requirements are to be coordinated with County boilerplate requirement for as-built and maintenance manuals, and Contractor must provide as-built information to meet these requirements.

E. Requirements of these Guidelines for Architects must be coordinated with the County's Fire Station Design Manual for applicable projects; and any conflicts brought to the attention of the project manager for resolution. Requirements of the Fire Station Design Manual must be adhered to in the design of all fire stations.

F. The Architect is responsible for submitting and tracking project plans through the County plan review process (Department of Public Works and Environmental Services (DPWES) site plan and building plan reviews) in a timely and diligent manner, and for making all required corrections, inserts, re-submissions, etc. Designers shall follow the DPWES site plan review checklist in the preparation of site plans.

G. The Architect must carefully review the County General Conditions and front end specification sections 01200-01700; and coordinate all design specifications with these County requirements. Any conflicts or proposed modifications impacting standard County sections must be brought to the project manager's attention for a decision.

H. All applicable requirements of the Fairfax County Special Inspections Manual (FCSIM) must be reflected in the project specifications. The structural engineer must comply with all requirements of the Special Inspections Program including stamping shop drawings as reviewed or approved, as required.

I. Space standards for County employees identified in the attached Fairfax County Office Space Standards are to be adhered to.
(See Attachment 01000-A)

J. Nothing in the Fairfax County Guidelines for Architects and Engineers is to be construed as waiving or granting exceptions to any element of state or local building codes or the Fairfax County Zoning Ordinance as applicable to the specific project. Any conflicts between these guidelines and the governing local, state, or federal codes should be brought to the immediate attention of the Fairfax County DPWES.

K. For buildings that are classified as critical structures, Fairfax County will hire a testing agency to perform all critical structure required inspections at the buildings. If the building is not classified as a critical structure, the Contractor shall have all required inspections performed at the building.

L. All civil, architectural, structural, electrical, mechanical, and plumbing floor plans (including reflected ceiling plans), as a minimum, shall be designed using a computer aided design (CAD) system. CAD designs will be turned over to the Owner on compact disk (CD) at the completion of the design. The architect shall use AutoCAD, Release 14 or later. Quality control of plans shall include overlaying CAD floor plans to check for conflicts. AutoCAD layering convention shall conform to AIA and Auto Desk standards. All specifications and addenda shall also be included on the CD in Microsoft Word format.

M. All bid document drawings (mylars) are to be sealed, signed and dated (on all sheets) by an Architect or Engineer registered in the State of Virginia prior to printing of the bid sets.

N. All guidelines for the design of trash and recycling rooms, and dumpster/compactor area that are identified in Attachment 01000-B are to be adhered to and reflected in the design documents.

O. Coordinate with Project Manager prior to start of survey and design to ascertain whether site plan is to be prepared in U.S. or metric units.

P. All computer software and data files associated with County projects are required to be Year 2000 compliant.

Q. Use of Architect's Drawings, Specifications, and Other Documents: The Owner shall retain ownership of the documents and shall have the right to modify the plans for maintenance, modifications, and/or renovations at the project. Such modifications shall be carried out at the Owner's risk.

R. Specifications shall require that the Contractor provide written, biweekly updates to the Owner/Architect detailing the status of all trade inspections including building, mechanical, electrical, plumbing, Fire Marshal, and Health Department, if applicable. Written updates shall specifically identify all items of work which have been rejected or otherwise not approved by inspectors.

S. The Architect shall include a Quality Control (QC) sign-off block on the cover sheet for all plan submittals. The QC block shall include the number of QC hours spent by each discipline and be signed off by the responsible person for each discipline.

T. The Architect shall clearly identify all products included in the specifications that contain post-industrial recycled content material, and all regionally manufactured materials as defined by LEED's Green Building Council criteria.

U. All site retaining walls and free standing site signs must be identified on the building permit application; otherwise, a separate building permit is required.

V. The Architect shall obtain a copy of the "Code Reference Package for Architects, Engineers, Designers and Installers" from the Fire Prevention Division of The Fairfax County Fire and Rescue Department (FRD), and all requirements of the Code Reference Package shall be reflected in the plans and specifications.

PRODUCTS

A. Any product(s) that are specified to be proprietary, or limited to less than three acceptable products, for which no equal products or substitutions are acceptable, must be identified to the Owner to be clearly identified in Specification Section E-Special Conditions. Justification for the proprietary or sole source specification must be provided.

Any specified material, equipment or system which will be either a proprietary or sole source item, must be approved in writing by DPWES, prior to advertisement for bids. The Architect shall obtain a written statement from the supplier or manufacturer of any proprietary/sole source item that identifies the bid cost for that item, prior to advertisement of bids.

B. The Architect is responsible for verifying that the manufacturer and product numbers for all materials and products included in the specifications are current at the time of bid. This shall include verification of all material and product designations included in these Guidelines.

02000 - SITE WORK

All site design must conform to the requirements of the Fairfax County Public Facilities Manual (PFM). All references for site construction and site details will be to the PFM or to Virginia Department of Transportation (VDOT) standards.

Specific areas of concern are listed below:

DESIGN

A. Drainage**:**

1. All storm sewer systems shall be designed for the 10-year storm event, all storm sewer pipes shall have a minimum slope of 2%, and all designs shall conform to Public Facilities Manual requirements.

2. Drainage systems shall be designed to convey water to a natural watercourse or to an existing storm drainage facility on or off site. Outfalls of drainage systems which discharge onto adjacent property shall be in easements from the property line to either an existing easement or to a natural watercourse with bed and banks.

3. Overland relief shall be provided so that buildings will not be flooded during major storms. Overland relief shall be evaluated using the 100-year storm.

4. The drainage system, including overland relief, shall be designed to account for flows from both on site and off site areas.

5. Reinforced concrete pipe shall be used for all drainage systems on County facilities. All structures and appurtenances used in the storm drainage system, such as endwalls, endsections, manholes and inlets, shall be either precast or cast-in-place reinforced concrete.

6. Grate inlets are expressly prohibited on County facilities.

7. No building or parts of buildings, including overhangs and footings, retaining walls, or other building structures shall be constructed or placed within, or encroached upon, County storm drainage easements or on County property where an easement would normally be required.

B. Grading**:**

1. Buildings must be sited so that no flooding will occur even if there is a failure of the piped system.

2. The site must be graded such that if the piped system did not exist, there would be no flooding of any buildings. The site plan will be reviewed against the above standard and must conform to it.

3. The first floor elevation of the building shall be 18" above the 100-year water surface elevation of the flood routing.

4. The building shall be sited on a pad that slopes away from the building at a slope of 5% for a minimum of 20 feet.

5. Grading will be designed to provide convenient access to the storm sewer and sanitary sewer facilities for maintenance and use.

6. No plants or landscaping shall be placed where they will interfere with the drainage patterns or where they will block access.

7. All grassed areas shall have a minimum slope of 2%.

8. All sidewalks with a slope greater than 3% shall have County standard UD-3 underdrain.

C. Stormwater Management**:**

1. All Stormwater Management (SWM) and Best Management Pond (BMP) facilities shall be designed for 2 year and 10 year storms and shall pass the 100-year storms as required by the PFM.

2. Design criteria relating to the maintenance of stormwater management facilities (detention and water quality) can be found in the latest version of the PFM, and include the following:

   a. Access ways to be cleared, graded, or constructed with the facility construction.

   b. Proximity to a public right-of-way to minimize the length of the access way.

   c. Multiple access ways for major facilities.

   d. No plantings, fences or other obstructions to access.

   e. No plantings on the dam or berm of any stormwater management pond, without specific approval of the Project Manager.

   f. No slopes greater than 3:1 along access ways.

   g. One all-weather roadway for access to major facilities.

   h. Provision of a concrete trickle ditch from the principal inlets to the outlet, with a minimum slope of 2%.

3. Underground stormwater detention and BMP chambers are specifically prohibited from use on County facilities.

4. Spot elevations should be provided in sufficient number to indicate to the Contractor the clear intent of the design for site grading and top of curb.

5. On parking lot islands, top of curb elevations shall be provided as shown below:

Width <5' Width > 5' Irregular shape

D. ADA:

1. All site design shall comply with the ADA. All variances from the ADA shall be brought to the attention of the project manager before incorporation into the plans. Accessible travel ways can not exceed a 2% cross slope, or a 5% running slope.

E. Landscape Development:

1. Designer Credentials

Any firm or individual charged with the preparation of landscape plans for new or existing public facilities must submit to the project manager the name of the person or persons who will be responsible for the plan preparation. No landscape plans, preliminary or final, may be submitted until the designer reviews this document and his or her credentials with the Fairfax County Urban Forestry Division. Persons preparing such plans must have a Bachelor's degree in Landscape Architecture, Horticulture or closely related field or certification as a landscape designer.

2. Plant Selection

The selection of plant materials will, in general, be made from the following list. Plant materials appropriate for the particular site and location should be reviewed and selected to promote short and long term survival. Common names of plants shall be included in the planting schedule for the site. Additional species may be used with approval of the Owner:

a. Shade Trees (deciduous)

Acer Campestre Styraciflua
Acer Ginuala
Acer Japonicum
Acer Palmatum
Acer Platanoides Sp
Acer Rubrum Bradford
Acer Saccharum
Ailanthus Altissima
Amelanchier Canadensis
Amelanchier Laevis
Carpinus Betulus
Cercidphyllum Japonicum
Cladrastus Lutea 'Tortuosa'
Fagus Grandifolia
Fagus Sylvatica
Fraxinus Americana
Fraxinus Pennsylvanica
Lanceolata
Gliditsia Triacanthus Sp
Larix Decidua
Liquidambar
Magnolia Virginiana
Malus Sp.
Oxydendrum Arboreum
Platanus Acerifolia
Pyrus Calleryana
Quercus Alba
Quercus Borealis
Quercus Cerris
Quercus Coccinea
Quercus Palustris
Quercus Phellos
Salix Matsudana
Saphora Japonica
Sorbus Alnifolia
Sorbus Aucuparia
Tilia Cordata
Tilia Tomentosa
Zelkova Serrata
Metasequoia Glyptostroboides

b. Ornamental and Flowering Trees

Cerccis Canensis
Chionanthus Virginicus
Cornus Sp
Cotinus Coggygria
Franklinia Alatamaha
Stewartia Koreana
Soulangeana
Styrax Japonica
Acer Palmatum
Prunus SerrulatVarieties
Prunus Yeodensis
Prunus Cerasifera 'Thundercloud'
Acer Griseum
Magnolia

Magnolia Stellata

c. Deciduous Shrubs

Abelia Grandiflora Intermedia
Buddleia Dauidii Intermedia
Chaenomeles Dauidii
Clematis Sp.
Clethra Alnifolia Amabilis
Cornus Alba.
Cotinus 'Royal Purple.
Daphne Burkwoodii.
Deutzia Gracilis.
Enkianthus Campanalatus
Forsythia
Hamamelis
Hydrangea Sp.
Kerria Japonica
Kolwitzia
Potentilla Sp
Syringa Sp
Viburnum Sp
Weigelia Sp

d. Evergreen Shrubs

Aucuba Japonica
Barberis (dwarf crimson pigmy)
Buxus Sp.
Cotoneaster Sp.
Euonymus Sp.
Gaultheria
Hypericum Sp. Ilex Sp.
Kalmia Latifolia.
Teucrium Chamaedrys
Nandina Domestica
Arctostaphylos UVA-URSI
Thuja Several Sp.
Osmanthos Sp.
Prunus Laurocerasus
Rhododendron Sp.
Sarcococca Hookeriana
Skimmia Japonica
Juniperus Sp.
Chamaecyparis Sp.
Cryptomeria Japonica (dwarf)
Pinus Mugo Mugus
Taxus Sp.Mahonia Sp
Yucca Filamentosa

e. Evergreen Trees

Cedrus Atlantica
Cedrus Deodora
Chamaecyparis Obtusa
Crytomeria Japonica
Ilex Opaca
Juniperus Chinensis
Juniperus Virginiana
Picea Abies
Picea Glauca
Picea Pungens
Pinus Bungeana
Pinus Cembra
Pinus Densiflora
Pinus Nigra
Pinus Pinea
Pinus Strobus
Pinus Sylvestris
Pinus Thunbergil

f. Perennials and Ground Covers

Ajuga
Day Lilies
Hosta
Lavender Sp.
Liriope
Santolina
Sedum
Vinca Minor

3. Spacing

a. Plants shall normally be spaced so that they will touch when they achieve 2/3 of their largest potential size. This rule obviously varies according to specific design objectives, but over-planting to achieve a premature "finished" look is not acceptable; nor is expanded spacings that result in permanent, unplanted, mulched areas.

b. No woody shrub is to be planted closer than three feet (1 meter) from a building wall or no tree, other than columnar evergreens should be within 15 feet (4.5 meters).

c. Maintain 10 feet clear around siamese connections and four feet clear around fire hydrants.

4. General Suggestions

   a. Locate plants in areas that are compatible with their growth requirements, i.e., azaleas should be used in a semi-shaded, well-drained locations rather than in sunny, pavement surrounded areas.

   b. Large mass planting beds or plants that will achieve a natural height or more than 3 feet (1 meter) shall not be used, except by roads, parking lots, etc. In general, such mass planting beds shall not be greater than 10 feet (3 meters) wide at any given continuous mulched bed.

   c. Beds planted solely with low ground cover plants, such as vinca minor, hedera helix, or pachysandra, are not acceptable. Such plants (except hedera helix) shall be used in conjunction with woody shrubs. Woody ground covers such as horizontal junipers, contoneaster, helleri Japanese holly, germander, or herbaceous materials such as lirioppe, sedum, etc. are acceptable, provided no planting of a single species exceeds 12 feet (3.6 meters) in bed width. Exceptions can be made depending on specific site conditions.

   d. All plants specified must be hardy to U.S.D.A. Zone 6. Specifications for all plant materials include adherence to the American Association of Nurserymen's "American Standard for Nursery Stock". Approved October 27, 1980, by American National Standards Institute, Inc.

   e. Specifications for all plant materials include adherence to the American Association of Nurserymen's "American Standard for Nursery Stock". Approved October 27, 1980, by American National Standards Institute, Inc.

   f. Specifications shall identify proper preparation of beds for trees, shrubs and ground cover in order to promote best chances for survival of plantings.

5. Locations for trees and shrubs must be coordinated with utilities, utility easements and conduits for street/site lighting.

6. All trees, shrubs and lawns are to be warranted and maintained by the Contractor (watered, fertilized, pruned, etc.) to ensure survival and to support the warranty for a minimum of one year after installation of the landscaping, but not less than one year from date of substantial completion. Upon completion of the maintenance and warranty period, the Facilities Management Division (FMD) and Construction Management Division (CMD) and the Contractor shall conduct a final walk-through of the site to ensure all plantings and lawn areas (grass) are acceptable. Minimum maintenance shall include weekly watering and spring and fall mulching.

7. Landscaping at all SWM and BMP must be coordinated with and approved by Fairfax County (Project Manager to coordinate with Maintenance and Storm Water Management Division).

8. The first approximately ten feet (3 meters) of lawn area nearest to the building on all sides shall be planted with sod. The requirement must be clearly reflected on the site plan, with an appropriate specification section included.

9. All project specifications shall require full lawn maintenance during the one year warranty/ maintenance period including watering, fertilizing, mulching, grass cutting, pruning, pest control, weeding of plant beds, edging, etc.

10. All new or disturbed drainage swales are to be sodded; or seeded, mulched and stabilized with biodegradable mat or fabric.

11. Specifications for seeding and mulching must include straw mulch, to protect seed during germination period.

F. Fire Lanes and Signage

1. All fire lanes and locations of signs shall be marked on the site plan per Section 313 of the Fairfax County Fire Prevention Code and the FRD Code Reference Package (See attachment 2000-A). Contractor is to provide required signs, curb markings and pavement striping.

G. Screening

1. If barrier fencing is required, coordinate with Owner for acceptable fencing, that must also comply with Zoning Ordinance requirements.

2. If block, masonry, stone or rubble screening or retaining walls are used, all wall elements must be securely anchored in place to prevent vandalism.

3. Screening walls and fence surfaces shall be treated with an anti-graffiti coating.

H. Pavement Design

1. All pavement sections for parking lots and roadways shall be designed based on CBR tests to be performed at appropriate locations during the initial geotechnical investigation. Specifications shall require the contractor to obtain additional CBR test results from soil samples at actual subgrade, and submit CBR results to engineer for final pavement design.

2. Any exterior architectural brick or stone paver's are to have a rough texture finish.

3. Provide a concrete pavement extension at the dumpster pad for truck tires. Include bollard's at rear and sides of dumpster location.

4. Dumpster space requirements are identified on Attachment 01000-B.

I. Site Lighting

1. Site lighting is installed by Dominion Virginia Power under the County's Municipal Street Lighting Contract. The site lighting design layout is to be prepared by the Architect and reviewed and modified as necessary by the Planning and Design Division (PDD). After approval by the County and Dominion Virginia Power the site lighting is to be incorporated into the site plan by the Architect. The empty conduit for the underground cables is to be included in the construction contract. Wiring and light fixtures are to be installed by Dominion Virginia Power. Architect is to prepare plats for Dominion Virginia Power easement locations based on approved site lighting

layout, if required. All site lighting designs must comply with Zoning Ordinance Glare Standards and shall utilize sharp cut-off fixtures.

J. General Requirements

1. Architect is to notify adjacent property owners of submission of site plan per DPWES and Zoning Ordinance requirements.

2. Contractor is to retain a testing agency to perform all site work testing and inspections more than 5' (1.5 meters) outside the building footprint. Contractor shall not use the same inspection firm as the County retains for special inspections.

3. Water meter must be properly sized to avoid unnecessary cost of purchasing oversized meter. Include note that Owner pays for water meter; Contractor picks up and installs.

4. Geotechnical report for projects located in problem soils must be submitted to, and reviewed and approved by DPWES Office of Site Development Services.

5. All utility company easements, new and existing, must be shown on the site plan. Architect shall prepare and submit to the County stamped mylar originals for all on-site and off-site easement plats for review and approval. All easement plats are to be prepared in the DPWES standard easement plat format. It should be noted that easement plats are required for sanitary and storm sewer facilities located on Fairfax County owned property.

6. Building corners are to be tied to property lines, using survey coordinates on site plan (geometric layout plan).

7. Identify service entry conduit for telephone, cable television, computer/data, and electric into appropriate room of building. Provide two-four inch conduits each for all Verizon (telephone) and Cox (CATV) from the main telephone room to the property line. Coordinate all new utility service and relocations, and identify all existing and proposed utility locations on the site plans.

8. Utility meters are not to be located at the front of the facility, and must be screened from view, where appropriate.

K. Sidewalks and Trails

1. A minimum of two (2) feet (0.6 meters) is required between the trail edge and any vertical obstructions such as trees, utility poles, signs, or other obstacles.

2. All vegetative material within a clearing envelope of at least 10 feet (3.0 meters) high by 10 feet (3.0 meters) wide shall be removed prior to trail construction.

3. The minimum allowable longitudinal slope for trail construction shall generally be no less than one percent (1%). Maximum longitudinal slopes shall meet ADA standards and shall not exceed 5% The minimum allowable transverse (cross) slope is 2.0%.

4. If longitudinal slopes on concrete sidewalks are equal to or in excess of three percent (3%) and when the underlying soil has 34% or more passing the No. 200 sieve and has a PI of 13 or less, Fairfax County Standard UD-3 sidewalk under-drain shall be installed.

5. Side slopes adjacent to sidewalks and trails shall not exceed 2:1.

6. All storm pipes associates with sidewalks and trails shall be reinforced concrete pipe, except for UD-3 sidewalk under-drains, where required by PFM.

7. Generally, 20 feet (6.1 meters) shall be the minimum allowable turning radius on sidewalks and trails. However, the actual minimum allowable turning radius shall be computed by the design engineer based on expected use and site conditions.

8. Provide a paved surface from all emergency exits leading away from the building to a paved area of refuge.

L. Termite Control

1. Require under the slab termite control with a one-year warranty from the date of substantial completion.

03000 CONCRETE

DESIGN

A. All structural calculations, drawings, and mix designs for cast-in-place, structural precast and architectural precast concrete shall be prepared under the supervision of a Professional Engineer (PE) licensed by the Commonwealth of Virginia. All drawings, calculations, and mix designs shall be signed and sealed by a PE licensed in the Commonwealth of Virginia. Specifications shall require the Contractor to provide PE certification of shop drawings, calculations, and mix designs.

B. Designer of cast-in-place and precast concrete elements shall comply with all requirements of FCSIM.

C. Project specifications shall state that the Contractor is not authorized to proceed with manufacture or procurement of cast-in-place or precast elements until applicable shop drawings, mix designs and color samples are approved; and any required mock-ups are constructed and approved.

D. Contractor is responsible for all concrete inspections, except for tests/inspections performed by the Owner when the building is classified as a critical structure.

E. Calcium chloride is not permitted in concrete used for reinforced concrete pipe or structures for drainage or drainage structures as per VDOT.

F. Mix design for sidewalks, curb and gutter, and other site work concrete shall meet VDOT mix design specifications.

G. Where concrete work abuts the building structure, plans will specify that the expansion joint will be caulked with a caulking that contains polyisocanate prepolymer.

SHOP DRAWING:

A. Project specifications shall require the Contractor to provide shop drawings for all cast-in-place, structural precast and architectural precast concrete, and all mix designs and connection details which are signed and sealed by a PE licensed in the Commonwealth of Virginia, as required by the FCSIM. Any documents which are required to be signed and sealed by a PE by the FCSIM which are not identified as a requirement of the Contractor in the specifications shall be considered to be a requirement of the Architect and the Structural Engineering Consultant.

B. Project specifications shall require that all structural precast or architectural precast elements be manufactured at a precast plant which is a certified member of the Pre-stressed Concrete Institute (PCI) and is operated under the supervision of a PE licensed by the Commonwealth of Virginia.

04000 - MASONRY

DESIGN

A. Designer of all masonry building elements shall comply with all requirements of the FCSIM if applicable. However, where practicable, load bearing masonry walls shall be designed in accordance with the empirical design method in order to keep the structure from being classified as a critical structure by the FCSIM.

B. Additions and alterations to existing structures shall be designed with matching mortar color, joint type, masonry color and texture, and masonry coursing pattern for all exposed masonry elements. Rake joints are not acceptable.

C. All exterior brick shall be 3000 PSI, Grade SW.

D. Mortar shall comply with ASTM C270 with minimum compressive strength of 750 PSI (higher compressive strength to be specified by mortar type as required). Contractor is required to hire a testing lab to take and test mortar cubes.

E. Glass block shall not be used on exterior walls without written approval of DPWES.

SHOP DRAWING:

A. Project specifications shall specifically require compliance with all applicable requirements of the FCSIM, where applicable. Any requirements of the FCSIM which are not specifically identified as a requirement of the Contractor shall be considered to be a requirement of the Architect and the Structural Engineering consultant.

1. Project specifications shall state that Contractor is not authorized to proceed with manufacture or procurement of masonry elements or mortar until all related shop drawings, mix designs, and color samples are approved; and any required mock-ups are constructed and approved.

05000 - METALS

DESIGN

A. All structural elements and connections falling under this section shall be designed and calculations performed under the supervision of a PE licensed in the Commonwealth of Virginia; and, all structural steel drawings and calculations shall be signed and sealed by the PE.

B. Structural steel designs and drawings shall conform to all requirements of the FCSIM.

C. Project specifications shall specifically require the Contractor to comply with all requirements of the FCSIM where applicable. Any requirements of the FCSIM which are not specifically identified as a requirement of the Contractor shall be considered to be a requirement of the Architect and the Structural Engineering Consultant.

D. All welders must be certified by American Welding Society (AWS). Contractor must submit copies of certifications for all welders before the welders will be permitted to work on the project.

E. Where practicable, steel connections are to be designed in such a manner as to avoid being classified as a critical structure; i.e., bolted connections are to be constructed as turn of the nut. Moment/rigid connections are to be avoided.

F. Contractor must touch up paint and/or primer after erection of steel or other metals.

06000 - WOOD AND PLASTICS

DESIGN

A. Counter tops shall be either cabinet supported or have front leg support. Unsupported spans in excess of 5' (1.5 meter) are unacceptable. All counter tops in wet and humid locations must have all undersides, edges and cutouts sealed with waterproof coating. Ensure that pipes, etc., do not interfere with recessed mountings. Counter supports and base cabinets must not preclude handicap accessibility requirements.

B. Counter tops at wet areas such as public restrooms and kitchens shall be made of homogeneous plastic material.

C. All surfaces of solid wood used for finishes at interior spaces must be sealed to prevent damage due to fluctuations in humidity and temperature. Wood paneling must have expansion strips built-in. Particleboard counters are not to be specified at wet areas such as pools, shower rooms, locker rooms, etc.

D. All millwork and cabinetry shall be specified to be custom grade, as a minimum, as defined by the Architectural Woodworking Institute (AWI).

E. Shop drawings for wooden roof trusses must be submitted to DPWES Office of Building Code Services for review and approval; and, drawings and calculations must be signed and sealed by a Virginia Registered Professional Engineer.

PRODUCTS

A. The preferred counter top material at public use rest rooms and kitchens is a solid, homogeneous plastic such as Corian by Du Pont, similar product by Fountainhead, or other equal product.

SHOP DRAWINGS

A. Contractor shall be responsible for paying DPWES review fees for wood truss shop drawings.

07000 - THERMAL AND MOISTURE PROTECTION

DESIGN

A. A metal coping system is preferred over a stone or precast coping system. The Project Manager must specifically approve use of a stone or precast coping.

B. Anodized aluminum soffit panels are preferred if the project budget permits. Gypsum board (drywall) is not acceptable at exterior soffits.

C. The Project Manager must specifically approve use of skylights on the project.

D. No asbestos containing materials are to be specified for roofing, insulation, fire stopping, fireproofing or any other materials on the project.

E. Adequate attic stocks for each type of sealant used must be required in specifications.

F. Pitch pockets should be avoided to the extent possible and should not be used where pipe columns penetrate the roofing system. An alternate method such as typical vent flashing should be used at pipe columns. All pitch pockets shall be fabricated from stainless steel or cooper, be half-filled with non-shrink grout and a pourable sealer, and shall comply with NRCA recommendations.

G. Roof drain design must be coordinated with roof ballast specifications to ensure that ballast does not clog the drains. Specify screens at roof drains, as required.

H. The use of internal gutter systems shall be avoided.

I. All roofs will be designed with a fall protection system as required by OSHA regulation 1926 Subpart M – Fall Protection (1926.500 to 1926.503).

J. All skylights will have a screen that complies with 29 Code of Federal Regulation CFR 1910.23(a)(4) which reads *"Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides"* or be constructed with material that meets the OSHA requirements to withstand accidental fall of person on the skylight.

K. All roof access hatchways will be protected as required by 29CFR 1910.23(a)(8) *"Every floor hole into which persons can accidentally walk shall be guarded by either: (i) A standard railing with standard toeboard on all exposed sides, or (ii) A floor hole cover of standard strength and construction."*

PRODUCTS

A. Fairfax County's preference is for Johns Manville or GAF built-up 3 or 4 ply systems with nominal 15 or 20 year warranties, respectively. In cases where single ply elastomeric membranes are appropriate and beneficial, the preference is for modified bitumen systems by Johns Manville, Firestone or U.S. Intec with standard 10, 12 or 15-year warranties.

In some instances, rubber membranes may be acceptable, the preference is EPDM, Goodyear, Firestone, and Carlisle 60 mil systems are the minimum acceptable. PVC and CPE systems are not recommended. Further, ballasted single ply systems are not recommended because of poor maintenance and performance histories. Fully adhered single ply systems are preferred. In cases where roof top mechanical equipment is involved, paver's should be provided to minimize accidental or incidental membrane damage. Concrete paver's should be used only as recommended by manufacturer. Compatible "membrane paver's" are acceptable. Non-curb mechanical equipment should be supported by platforms with pipe columns with umbrella flashings where applicable. Height of column should be a minimum of 8" above roof membrane.

08000 - DOORS AND WINDOWS

DESIGN:

A. Provide a key cabinet. The cabinet should be designed to accommodate 50% more keys than the current project requirements.

B. Architect shall coordinate keying schedule with the Project Manager (Project Manager is to coordinate with FMD) and the using agency. Using agency will sign off on an approved schedule. All changes will be coordinated with FMD. Contractor must sort, label, and tag all keys; set up key cabinet with index; and review with Owner.

C. Provide adequately sized access doors or panels in all walls and ceilings to permit access to all mechanical, plumbing, electrical or fire alarm equipment which may require maintenance or updating. Minimum access door dimension is 15"; minimum access door size in ceilings is 24" x 24".

D. Windows should be protected with drip caps to keep rain from entering the walls. Steel sash windows should not be used. All new or replacement windows shall utilize thermo-pane glass, with thermo break sash. Green tinted glass shall not be specified.

E. All doors within a building, both interior doors and fire rated doors, should have matching finishes.

F. All coiling grilles must be designed with governors. Additional structural support for coiling grilles and overhead doors must be shown on the plans.

G. Door numbers in the design documents should match the final operational door numbers/room numbers so that signage, keying and move-in are made easier.

H. All doors shall have floor mounted door stops in areas that have sheetrock partitions.

I. Operable windows are not permitted unless specifically approved in writing by DPWES. Screens must be provided if operable windows are approved for use.

PRODUCTS

A. All finished hardware should be selected from one of the manufacturers with 6 pin keys and in series as listed:

Sargent	Line Series 10 LA Keyway
Schlage	'D' Series 'C' or 'E' Keyway
Corbin	400 Series Keyway Z-60-6

B. The preferred lockset is Schlage D Series, Rose Design levers for handicap accessibility. Where lever locksets are not required, the preferred lockset is Schlage D series Orbit knob design. Finishes shall be US 626 or 32D.

C. The keying system should be compatible with existing Schlage Master Key System as follows:

Libraries	'E' Keyway- 35-101-E Keyway
Fire Stations	'C' Keyway- 35-101-C Keyway
Government Centers	'C' Keyway- 35-101-C Keyway
Community Centers	'C' Keyway- 35-101-C Keyway
Shelter Facilities	'C' Keyway- 35-101-C Keyway
Maintenance Facilities	'C' Keyway- 35-101-C Keyway

D. Access control system locks shall be electric with card/card reader access control. All access control systems shall be specified as sole source items. Access control systems shall be either *TAC-Americas with INET 7 software*; or Northern system with Win-Pak software. The system to be specified as a sole source item is dependent upon the particular building. All access control system components must be supplied by the sole source manufacturer to ensure compatibility for networking integration with like systems in other buildings. The current version of the system software must be specified.

Access control cards and card readers shall be by HID Corporation, or equal. Cards and card readers must be fully compatible with HID Corporation cards and card readers.

E. For partial renovations, all finished hardware should match the existing as much as possible in finish, style and keyway in order to maintain continuity.

F. Where handicap accessibility is not required, surface mounted door closers should be Norton #1603 or #1604 or equal. Handicap accessible closers should be LCN 1461 or equal.

G. Floor type door closers should be Rixson #27 or #28.
Where handicapped access is required use Rixson PH27 or PH28.

H. All panic hardware should have removable core cylinders to match the building Master Key System. Von Duprin is the preferred panic hardware. Coordinate panic hardware with ADA requirements to ensure that minimum of 32" clear door opening with is maintained.

I. Hydraulic actuators should not be used for handicap door openers.

J. Hinges at all doors should be ball bearing type.

K. Fairfax County Fire Prevention Code requires the installation of an approved emergency building entrance system (key box or knox box) for all buildings with the exception of single family dwellings. See attachment 08000-A.

L. Electric strikes shall be Folger Adams, or an approved equal.

09000 - FINISHES

DESIGN

A. Lath & Plaster

Specify, at a minimum, the industry standard for expansion joints.

B. Gypsum Board

If a gypsum fire-rated assembly is provided, the UL number must be specified. If a gypsum board ceiling is designed, access panels must be provided for maintenance access. Panels must be provided for all maintained elements. If provision of the access panels compromises the aesthetics of the ceiling, either relocate the maintained elements to an accessible ceiling or change the design of the ceiling. Water-resistant gypsum board must be specified for wall and ceiling use in bathroom and locker room areas. DuRock or equal product must be used in shower areas and wet areas around lavatories.

C. Ceramic Tile

Provide a minimum of 25 SF of attic stock (12m) of each type and of each color of ceramic tile used. Bathrooms should be ceramic tiled on the floor and for the full height of wet walls. DuRock or equal product must be used behind ceramic tile at wet areas. Full mud-set tiles with plaster and galvanized wire lath substrate is preferred at floor areas. The preferred method for setting wall tiles is use of thin set mortar.

D. Wood Floors

Prior approval must be obtained from the Project Manager for use of wood floors and for design of the support system for the wood floors.

E. Special Flooring

Use of any special floorings should be brought to the attention of the Project Manager. Fairfax County has not had successful installations of some special floorings, prior approval of special floorings is required. Examples of special floorings are hardwood, terrazzo, and epoxy or resin floors.

F. Wall Covering

If project funds are sufficient, and the Project Manager has approved, provide vinyl wall coverings on walls in lieu of semi-gloss latex. If wall coverings, vinyl or others, are provided as above or in specific spaces, specify a line or pattern such that the full color palette for that line or pattern is available. A minimum of three color choices should be

specified to provide flexibility to the user.

G. Attic Stock

Two (2) double rolls of each type and color of wall coverings used. The attic stock dye lot must match the dye lot of the wall covering installed.

H. Ability to gain access to maintained elements is the primary concern. Any ceiling system utilized must be accessible if there are maintained elements above it. If access to maintained elements cannot be relocated above an accessible ceiling, then a 2 x 4 or 2 x 2 lay-in ceiling will be provided. Use of a ceiling system that does not provide access for maintenance will not be permitted.

I. All walls and ceiling finishes at kitchens and food preparation or serving areas are required by the Health Department to be completely smooth and cleanable. No surface texture is permitted at these locations. CMU walls with block filler and paint/epoxy finish systems have been deemed unacceptable due to the reflection of the block texture through the finish system.

J. All bathroom partitions are to be sound insulated, floor to ceiling partitions.

PRODUCTS

A. Acoustical

The acoustic ceiling tiles must be as follows:

Armstrong 756 for 2' x 2' (600mm x 600mm)
Armstrong 755 for 2' x 4' (600mm x 1200mm)
Armstrong 896 for 2' x 2' (600mm x 600mm)
UL rated fire guard
Armstrong 895 for 2' x 4' (600mm x 1200mm)
UL rated fire guard

A 12" x 12" (300mm x 300mm) concealed spline is prohibited.

If any system other than 2' x 4' (600mm x 1200mm) acoustical is too be used, prior approval of the Project Manager is necessary before incorporation into the documents. Access to maintained elements must be provided in any ceiling system used. Provide two unopened cartons of each type of ceiling tile used.

Use of any ceiling system other than a 2 x 4 (600 x 1200) or 2 x 2 (600 x 600) lay-in will be coordinated with the Facilities Management Division (FMD). FMD must have easy access to above ceiling elements. If provision of a 2 x 4 (600 x 1200) or 2 x 2 (600 x 600) lay-in ceiling will compromise aesthetics; either provide access for maintenance through the proposed ceiling, relocate maintained elements above an accessible ceiling or provide the 2 x 4 (600 x 1200) or 2 x 2 (600 x 600) in spite of aesthetic impact.

B. Resilient Flooring

The desired resilient flooring is 12" x 12" (300mm x 300mm) VCT, preferably Armstrong Excelon. Specify that there will be three color choices for tile, base and treads. Other elements should be coordinated with the VCT color(s).

Attic Stock:

VCT - 1 unopened carton of each color and type.

Vinyl base - 1 unopened carton of each type and color.

Vinyl accessories - 50 linear feet (15 meters)

Vinyl/rubber stair treads - 10 each of each color or type.

C. Carpet

Square carpet tiles will be used. If broadloom or sheet stock is to be specified, prior approval must be obtained from the Project Manager, who will coordinate with the FMD. An installer approved by the manufacturer must install carpet. The following manufacturers and manufacturer carpet lines are desired. Architect shall verify that the specified carpet tile, product lines are still available at the time of bid advertisement.

1. Milliken Modular Carpet Tile:

(a) Color Visions, Hues/Tweeds/Stipples
(b) Color Bond
(c) Rainbow Tweed II
(d) Texture Visions, All Patterns
(e) Talisman
(f) Midnight Sparkle
(g) Revelation
(h) Colorweave

2. Interface Carpet Tile:

(a) Libea-Scorpio
(b) Tones-Plus
(c) Compositions
(d) Tapestry Plus and Moire Plus Plus III
(e) Notes
(f) Leader
(g) Strata
(h) Successor

D. Attic Stock

Specifications will require provision of attic stock in unopened cartons and matching dye lot, equal to 5% of the carpeted area of the project. In addition, all usable scraps larger than two square feet, or more than 811 (200 mm) in width, shall be turned over to the Owner. Specify a choice of at least three colors of carpet.

E. Painting of interior surfaces should be of the following paint types:

Walls - semi-gloss latex
Ceiling - flat latex
Door and frames (metal/wood) - oil base, semi-gloss

Acceptable manufacturers are Duron, Sherwin Williams, and Benjamin Moore. All surfaces shall receive a minimum of two coats of paint, in addition to an appropriate primer coat. Each coat must be allowed to dry completely before application of the next coat. Specify at least three color choices for the walls. A minimum of two gallons of each color and type of paint used shall be provided as attic stock.

10000 - SPECIALTIES

DESIGN

A. Counter tops should be either cabinet supported or have front leg support. Unsupported spans in excess of 5' (1.5 meter) are unacceptable. Counter tops in shall have all undersides, edges and cut outs sealed with waterproof coating. Ensure that pipes, etc., do not interfere with recessed mountings. Counter top supports shall be designed so as to conform to requirements of the ADA.

B. Fire extinguishers shall be hung or cabinet mounted with a maximum permissible mounting height to top of extinguisher of 60" (1500 mm). The charging date tagged on all fire extinguishers shall be the date of substantial completion. Fire extinguishers must be provided at elevator machine rooms, fuel sites, and mechanical equipment rooms. Provide recessed fire extinguisher mounting as required to meet ADA Section 4.4. Roll-type, lever operated paper towel dispensers are to be specified for employee restrooms.

C. Toilet partitions must have both floor-to-ceiling and wall bracing. Wall backing in all rest rooms should be water-resistant plywood, water-resistant gypsum board, or DuRock (or equal). Urinal screen shall have floor to ceiling pilaster support. Check line of sight from entry door to urinals and to mirror reflections. Toilet partitions and screens shall be constructed of Phenolic or a similar durable material.

D. Flagpoles shall be designed for ease of maintenance, and for simple rope and halyard replacement. Flagpoles shall be anodized aluminum or aluminum.

E. All public and staff rest rooms shall be provided with level operated, roll-type paper towel dispensers.

F. All public restrooms shall be provided with baby changing stations.

G. Each room in the facility should be labeled or numbered to facilitate maintenance and emergency response, according to the following scheme:

1) Signage to comply with requirements of ADA as to character, proportion, height, finish, mounting location and Braille content where required.

2) Rooms which are identified (labeled) as to use do not need to be numbered. Examples:

"Men"
“Women"
"Janitor"
"Telephone Equipment"
"Electrical Equipment"
"Mechanical Equipment,” etc.

3) Rooms that are unlabeled should have numbers provided on the upper corner of each door or door jam of main door to each room. Numbers should be small 1" (25mm) and stenciled so as to be of use only to Maintenance Personnel; or, if the numbering system is to be referenced on the Building Directory, utilize larger more visible numbers. Exact signage requirements will be specified during the design phase. Numbering of Electrical, Mechanical, and Telephone Equipment Rooms should be provided if there is more than one of each such rooms in a facility. The larger, more visual room numbers must comply with ADA where utilized.

4) Any room containing equipment related to the fire alarm system, must have signage meeting the Fire Marshal's requirements in terms of lettering size (1 ½") and contrasting colors. Typical rooms may include but are not limited to Main Electric Room, Fire Control Room, Fire Pump Room, Sprinkler Riser Room and Sprinkler Control Room.

5) Janitors' closets should be constructed as per attachment 10000-A. Janitors' closets used for storage of any quantity of highly combustible material must be sprinkle red. One closet per 25,000 square feet. (2323 m^2 gross floor area, or increase size of closets proportionally) must be provided. The size shown is a minimum size. A 110-volt outlet must be provided at all janitors' closets.

6) Space for recycled material collection/storage near the loading dock or dumpster area should be given consideration.

H. Room names in the design documents should match the final operational room names to make signage preparation and move-in much easier.

I. All mechanical or electrical equipment located above a suspended ceiling shall be labeled/ identified at the suspended ceiling. Fire alarm devices located above a suspended ceiling must have a nameplate identifying the device at the appropriate suspended ceiling location and also at the point of access to the device if different from the suspended ceiling. Name plates for fire alarm devices shall be ½" (13 mm) minimum height white letters engraved on a minimum 1" (25 mm) wide red plastic laminate plate.

J. The street address number must be provided, clearly visible on the front of the building.

PRODUCTS

A. Toilet accessories preferred are as follows:

Tissue Holder	Bobrick B-274
Towel Dispenser For Handicap Accessible Combination Napkin/Tampon Areas Use Dispenser	Bobrick B-360-P Bobrick B-3900 Bobrick B-280 2 x 2
Napkin Disposal	Bobrick B-270
Soap Dispenser	Bobrick B-2111
Toilet Seat Dispenser	Bobrick B-221

B. Infrared sensors are not to be specified for use in automatically activating lavatories, urinals or water closets. All of these fixtures are to be manually operated.

11000 - EQUIPMENT

DESIGN

A. Voltage for clothes dryers shall be 208/277.

B. Washing machines must be bolted to slab embeds; and be provided with vibration isolators, as required. Any washing machines which are to be located on an elevated, structural slab must be analyzed for harmonic impacts in conjunction with the structural plans, and the appropriate vibration isolation or dampening provided.

C. Coordinate design of exhaust flues for dryers with dryer manufacturer.

D. Provide floor drains at all public restrooms and at laundry rooms.

E. Coordinate voltages for washing machines and dryers between electrical plans, specifications, schedules, and disconnects.

F. Equipment plans for any kitchen equipment must be closely coordinated with electrical power drawings to ensure consistency between power requirements and power provided.

12000 - FURNISHINGS (Systems Furniture)

DESIGN

A. All system furniture provided on Fairfax County projects is to be specified to have a County standard fabric pattern. The standard patterns are "custom color stacking boxes" and "Labyrinth; Pebble" by Knoll. Fabric specifications must be coordinated with the Project Manager and the FMD.

B. The plans must clearly show whether the Contractor or the Owner is responsible for making the final electrical connection of the systems furniture whip (pig tail) to the electrical junction box. Typically, this is done by the Owner (FMD); however, this must be coordinated and clearly shown.

PRODUCTS

A. Systems furniture shall be designed based on the companies currently under contract with the County:

MANUFACTURER -	Knoll
SYSTEM -	Morrison
INSTALLER -	Interior Elements

Colors shall be as follows:

LAMINATE -	Medium Grey
OVERHEADS/FILES -	Fairfax Grey (front)/Light Grey (case)
CUSTOM FABRIC-	B Stacked Boxes; Custom Color or Labyrinth; Pebble

Refer to attachment 01000-A for workstation configuration based on County Office space standards.

13000 - SPECIAL EQUIPMENT

This sheet intentionally left blank.

14000- CONVEYING SYSTEMS

DESIGN

A. All large multi-story buildings should have a designated "Freight Elevator" with direct and convenient access to a loading dock or freight entrance. The exact requirements for elevators will be determined during the programmatic phase. Full maintenance service and inspections shall be provided, by the installer, during the one year warranty period and for an additional year beyond the one-year warranty period.

B. Any other conveying systems, including pneumatic tube and dumbwaiters, shall include full maintenance by the installer, during and for one year beyond the one year warranty period.

C. Provide sump pump pit at elevator pit, but no sump pump or piping.

D. Shunt trip disconnect shall be used in elevator machine room, not panel board.

E. Provide protective cages for light fixtures in elevator machine rooms.

F. Contractor is responsible to provide, install, and wire the emergency elevator phone.

G. Any surfaces which project out into the elevator shaft must be angled from the wall surface down. No flat surfaces in the horizontal plane are allowed in the shaft.

H. Specifications shall require that the contractor comply with County (Facilities Management Division) maintenance protocol for all maintenance and inspection work performed.

15000 – MECHANICAL/PLUMBING

DESIGN

A. General

1. Where building size and use require complex multi-zone comfort systems, central plant configurations are preferred. In such cases, the basis of the heating and cooling system should be centrifugal chillers above 120 tons and reciprocating type below 120 tons supplying chilled water to V.A.V. air handling units. A four-pipe system should be used. Firetube hot water boilers supplying hot water to perimeter baseboard or VAV terminal mounted heaters and air handlers (morning warm-up) should be used for the heating system. Temperature controlling system should be electronic (DDC) with differential enthalpy controlled economizer, night set back and morning warm-up functions. Chillers should be located in an enclosed mechanical room. Provide refrigerant monitoring, detection, alarms, and ventilation as required to meet Mechanical Code requirements and ASHRAE standards.

2. In small, less complex buildings, roof top units with natural gas heat (where available) and DX cooling are preferred

3. Where gas is not available, packaged air to air heat pump units with 100% electric back up are acceptable. In all cases, condensate piping shall be provided to a storm drain or directly outside; and the piping securely anchored to the floor.

4. The Architect shall send building load letters to the electric and gas companies at appropriate times during design.

5. The HVAC system shall meet all building code requirements for heating and cooling loads. In addition, the code requirements the HVAC designer shall pay close attention to anticipated actual building loads to ensure that the system efficiently meets these requirements. Fairfax County has had problems with systems that meet the code requirements but do not effectively heat, cool or dehumidify the building in actual loading conditions. Descant humidifiers should be considered for all systems that introduce large quantities of outside air into an occupied space. Building envelope components shall be designed for energy efficiency in compliance with ASHRAE, BOCA Mechanical and other applicable building and energy codes.

6. Architect shall submit cut sheets for the major equipment pieces which form the basis for design at the Design Development stage. The cut sheets must identify equipment dimensions, and the Architect shall provide detailed plan and section views (1/4" = 1' or larger scale) dimensioned to show the major equipment, duct work and piping located at mechanical spaces. Detail plans must reflect that adequate space and clearances are provided for inspection, maintenance and replacement access, and all major mechanical equipment.

7. Provide sanitary sewer clean-outs at each end of building at main sanitary sewer trunk lines.

8. The Architect shall coordinate with the Project Manager and Facilities Management Division prior to selection of the mechanical system.

9. Architect shall conduct a life-cycle cost analysis for a minimum of two alternate mechanical system options during the Schematic/Design Development phase.

10. The Architect shall retain an independent HVAC Commissioning Agent to review mechanical plans and specifications and to conduct commissioning of HVAC systems in the heating and cooling modes.

B. Heating and Cooling

1. Systems designed should maintain the following temperature settings.

	OCCUPIED	UNOCCUPIED
General Office Space Heating	72°F	55°F
General Office Space Cooling	76°F	85°F
Warehouses/Garages/Apparatus	60°F	N/A

2. Outside Air Design Parameters (temperatures) for General Building Areas.

Winter 14°F
Summer 91/74°F

Verify design temperatures with ASHRAE Standards.

3. Strong consideration should be given to energy conservation, life cycle cost analysis of alternate systems shall be performed.

4. Warehouses, garages and Fire Station Apparatus Bays should be provided with infrared tube heating systems and should not be air-conditioned. All systems should include economizers for "free cooling" during the intermediate seasons.

5. The building thermal envelope should as a minimum be designed as follows:

Window U-Factor	0.50 Maximum
Average Wall U-Factor	0.1 Maximum
Soffit/Floors U-Factor	0.10 Maximum
Roof U-Factor	0.05 Maximum
	0.10 Maximum in storage/equipment room

6. Provide HVAC zones for different functional areas and to allow for night use in appropriate areas.

7. Where design loads for a space my vary significantly from actual, normal loads, the system shall be designed with capacity reduction capability.

C. Mechanical Specifications Requirements

Regarding the mechanical system, the following criteria should be included in the specifications:

1. Boilers - The specifications should include:

   a. Outside Air Reset - outside air reset of system supply water temperature should be provided via dual-bulb electric or pneumatic aquastat controller rather than 3-way bypass valve with single-bulb boiler aquastat. The main concern is maintaining a constant temperature inside the boiler to reduce wear caused be expansion, contraction, and condensation.

   b. Combustion Efficiency Test - Burner should be tuned up for maximum performance, including correct nozzle size, flame shape, and air damper adjustment for minimum excess air. Performance should be verified via written results of an instrumented combustion efficiency test, including test data net stack temperature, percentage C02 or 02 oil smoke spot or percentage C0, and total combustion efficiency percentage.

2. Where removable printed circuit boards are provided, an extra set should be furnished including description, manufacturer, and source of supply identified.

3. Provide spare relays for A/C units plus name of manufacturer, and source of supply (include in Maintenance Manual).

4. Provide one extra set of belts for each belt driven unit.

5. Provide two extra changes for each type filter. 2" pleated are preferred. Install new filters at Substantial Completion in addition to the two spare sets.

6. Provide proper set of any non-standard test tools/equipment and appropriate training for installed equipment. Be specific. If possible, avoid specifying non-standard test tools/equipment.

7. The temperature control system and the energy management control system shall be provided by one manufacturer.

8. An instructional session shall be held after systems are functional to familiarize Fairfax County staff (FMD) mechanics with the design and construction of the system. Time shall be set up during the warranty period for "shake down" meetings as needed. Total instructional and "shake down" time provided by the design engineer and installing Contractor shall be coordinated with the Owner prior to bidding but shall not be less than twelve hours. Contractor shall video tape all instructional sessions and provide the videotape to the Owner.

9. Maintenance needs and responsibility should be clearly defined before the system is accepted by Fairfax County. The specifications shall provide for a two-year maintenance and warranty period for all HVAC systems and associated controls. Requirements of this extended warranty period must be defined during design and specifications development process.

10. If roof mounted A/C units are used, provide a power receptacle, an interior stepladder with hand rails, steps 12" apart and top step no more than 15" from opening up of roof hatch. Roof walkways must be provided in all expected travel areas and around roof top units. Provide platforms around HVAC units elevated above roof surface. Ladders must be provided to all roof levels.

11. Mechanical equipment rooms located on the ground floor and roof shall be accessible from outside the building and shall be provided with double doors. Paved access for maintenance vehicles shall be as close as possible. Equipment rooms must be weatherproofed and have secure locking hardware.

12. Provide wall mounted (framed and covered with Plexiglas) control diagrams in all boiler and mechanical rooms. Diagrams shall show, as a minimum, all equipment and controls in that room, temperature pressure and flow rate operating and limit values, as well as any applicable electrical schematics.

13. All valves shall be numbered with brass tags and referenced to operational instructions.

14. Provisions shall be made for metering of heating fuel oil consumption. Provide back flow preventers in fuel lines, as required. Exposed exterior fuel lines must be insulated/heated.

15. Facilities Management Division (FMD) staff shall also be notified when system balancing is scheduled so HVAC mechanics can observe the procedure.

16. Access panels or doors must be provided for any equipment located in all wall or ceiling spaces that may require maintenance, repairs, or modifications.

17. All equipment, smoke detectors, heat detectors, etc., which are located above a suspended ceiling must be clearly labeled at the appropriate location on the ceiling.

18. Centrifugal type chillers shall be specified to operate using R-123 or R-134A refrigerant.

19. All motors are to be high efficiency type.

20. A minimum of three-foot clearance is required at electrical elements at VAV boxes, fan coil units, etc. per National Electric Code (NEC.)

21. Refer to the Mechanical Code for requirements to provide guardrails at the edge of roof areas adjacent to rooftop equipment that will require maintenance access at the roof level.

22. No plumbing piping is to be installed over top of electrical panels or equipment, unless in compliance with NEC limitations.

23. Provide water source near outside and rooftop mechanical equipment. Water spigot at exterior of building shall be designed to limit access to authorized personnel. (Keyed spigots)

24. Domestic water supply for the cooling tower and any irrigation system shall be sub-metered to reduce monthly sanitary sewer costs.

25. Infrared sensors are not to be specified for use in automatically activating lavatories, urinals or water closets. All of these fixtures are to be manually operated.

D. Insulation

1. All ductwork and piping that will lose energy to or gain energy from the surrounding atmosphere or may cause condensation problems should be properly insulated to minimize energy costs and condensation problems. All roof drain piping shall be insulated.

2. Electric heat trace, tape system shall be provided for exposed exterior fuel oil lines; but shall not be specified for hot water system.

E. Energy Management and Control Systems

1. In all buildings, an energy management and control system (EMCS) shall be installed.

2. The energy management and control system shall monitor and control HVAC operations and conditions, alarm abnormal conditions and index control modes and provide AHU optimized start/stop operations, and provide reporting and trend logs. The specific system requirements shall be reviewed with the Project Manager during design.

3. The plans and specifications for the EMCS must include a detailed points list showing all monitor and control points and identify all required software and hardware.

4. The EMCS must be capable to perform the following functions:

Monitor and Alarm Selected Conditions: Temperature; Pressure; Flow; On/Off, Start/Stop Status; Safety Control Status (Fire, Freeze, Smoke).
Initiate Selected Control Sequences:
AHU/Chiller/boiler/pump; Start/Stop; Occupied/unoccupied modes; Optimized Equipment Start/Stop operation. (it shall not duty cycle VAV air handling units).

5. The EMCS should not be directly involved in the local loop controls, and the local loops shall continue to operate if the EMCS fails.

6. All EMCS components shall have surge suppression devices and battery backup. Central computer system shall have uninterruptable power system. A central control keypad and computer interface port shall be provided at the

building maintenance office for controlling the EMCS system; unless otherwise directed by DPWES.

7. The EMCS must be capable of alarming to, and be communicated and programmed by any compatible personal computer via modem. EMCS shall be expandable and be compatible with the electronic equipment controls. EMCS must have a security password/code for system entry and programming. A telephone jack shall be provided for modem installation.

8. A personal computer with graphics, internal modem and printer shall be located in a securable room located near or within the mechanical room. Remote processing units shall be capable of communicating with the local terminal. Provide two copies of the EMCS software; one for onsite use and one for FMD's central monitoring/control station.

F. Fire Protection

1. Sprinkler System to be designed, installed, and tested in accordance with all applicable codes and reviewed and approved by local authorities having jurisdiction. Contractor is responsible for all shop drawing review fees and permit fees charged by the Fire Marshal's office.

   a. Sprinkler piping is not to be routed over top of electrical panels or equipment, except as specifically permitted by NEC.

   b. The inspectors test valve shall be located in a readily accessible location. This is essential to minimize the impact to the user agencies during the cyclic testing. Provisions for discharging the water during the cyclic system test shall be made by piping the drain to the exterior of the building. The use of buckets for cyclic testing is not acceptable.

   c. Sprinkler devices, valves, etc., shall be permanently tagged noting the device and its purpose. Valves or devices that are located above accessible ceilings should be marked at the ceiling level indicating a device or valve above.

   d. The use of McDonnell & Miller flow switches for the sprinkler system is unacceptable. These are not rated for use with fire alarm systems.

   e. Do not specify Central Omega sprinkler heads for use on any Fairfax County project without prior, written approval from the Fairfax County Fire Marshall.

   f. Dry sprinkler valves shall be installed so that a proper test, reset, and maintenance can be performed from one location. Use of dry type sprinkler systems is discouraged due to maintenance requirements.

      Pressure gauges, drains and valves shall be installed as required to accomplish this.

   g. Specifications shall require contractor to provide attic stock sprinkler heads and spare sprinkler head wenches.

G. Commissioning

1. Requirements for an HVAC system commissioning process shall be included in the scope of work for the Architect, Mechanical Engineer, and the construction contract. An independent Commissioning Authority may be hired by the Owner or the Mechanical Engineer may be responsible for the Commissioning work. The ASHRAE standard guidelines for commissioning shall serve as the basis for all HVAC commissioning and the guidelines will be tailored to the specific requirements of the project.

2. The Architect and Mechanical Engineer will perform reviews of the HVAC system design from a commissioning perspective at all review phases of the design process, and will cooperate fully with the Owner's Commissioning Authority throughout the design review process as applicable.

3. The contract specifications must clearly spell out the responsibilities of the General Contractor and all appropriate subcontractors relative to commissioning, and shall also define the role of the Commissioning Authority.

4. The Architect and Mechanical Engineer will coordinate and cooperate fully with the Owner's Commissioning Agent and with DPWES representatives throughout the actual HVAC system commissioning process prior to and subsequent to system acceptance. The Architect and Mechanical Engineer will provide all design and or system information that is requested by the commissioning team members and will respond to all comments from the Commissioning Authority from design through system acceptance.

PRODUCTS

A. Mechanical Equipment Preferences

Below are listed recommended equipment brands for which supply of repair parts exist:

Chillers:	Trane centrifugal Trane reciprocating with air-cooled condenser
Cooling Towers/Pumps:	Baltimore Aircoil, Bell, Gossett Series, 1510 Evapsco
Boilers:	Cleaver Brooks horizontal firetube comb. Natural gas/#2 oil Fired Burnham 4F
Air Handlers:	Trane, inlet vane or variable frequency drive VAV with 100% O.A. capability and low leakage dampers.
VAV Boxes:	Titus, Trane Electronically controlled
Electronic System:	1. Johnson controls 2. Trane 3. Siebe-Pritchett, Inc. 4. Siemens Technologies, Landis Division

Rooftop Units Motor Control Centers Volumetric Control	Trane, Carrier, McQuay, Hammer, General Electric, Cambridge (If not under ATC contract)
Domestic WTR Booster Pumps Hot Water Baseboard	Bell and Gosset Bronze Construction Trane without Dampers
Energy Management and Control System	*Invensys-Pritchett*, Trane, and Seimens (No Substitutions)
Underground Storage Tanks	Fuel double wall fiberglass reinforced plastic (FRP) coated (100 mils), double wall welded steel with a primary (internal) tank and a secondary (external) tank; as manufactured by Buffalo Tank Corporation or Adams Tank Corporation; fuel sensor shall be a magnetic probe. Include a quick release filler neck and a watertight raised access to filler neck.
Fuel Storage Monitoring and Leak Detection System	Veeder Root Model TSL-350 (No Equals)
Submersible Fuel Pump	Redjacket (No Equals)

B. Plumbing Equipment Preferences

For plumbing systems, American Standard or Kohler fixtures with Sloan flush valves are recommended. Faucets should be Moen. Provide ball type shut off valves to isolate individual rest room areas and provide access to valves in janitor's closets adjacent to rest rooms.

Provide service valves to enable segmented shutdown of building's water lines. Provide repair kit for any non-standard type plumbing fixtures and faucets.

1.	Water Closets:	Water closets should be floor mounted Sloan flush valve type. Kohler Model #k-4262-ET with 12 inch rough-in water closet is recommended.
2.	Faucets:	Self-closing metering faucets should not be specified unless required by code. Moen, American Standard-Single lever is preferred. (No plastic handles/knobs.)
3.	Flush Valves:	Sloan
4.	Frost Free Hydrants:	Josam, Woodford
5.	Vitreous China Fixtures:	American Standard, Kohler
6.	Garbage Disposals:	Insinkerator (I.E.S.)

7. Cleanouts: Accessible cleanouts should be located in all locker rooms and rest rooms.

8. Valves All valves 2” and smaller should be ball type valves.

16000 - ELECTRICAL

DESIGN

A. ELECTRICAL MAIN SERVICES:

1. Where appropriate a three-phase four wire 277/480 volt main service is preferred. The main electrical service should have a minimum of six spare fuses of each type used in the facility. All building wiring shall comply with current NEC.

2. To comply with OSHA's lock out tag out requirements, disconnects, panel boards and all electrically powered equipment shall have a means of de-energizing and locking out the equipment for service or repairs.

3. Trapeze mounted transformers are not acceptable. Trapeze mounted transformers do not permit free and ready access for emergency repairs or for routine maintenance. This type mounting creates a dangerous work environment for employees.

4. Data and communication rooms shall be separate rooms from the electrical supply closet. This is necessary to keep cable clutter and risk of electrical shock to a minimum. All data and communications rooms shall be provided with receptacles that are powered by the emergency generator circuit. No electrical transformers or distribution panels are permitted in telephone/data or communications closets.

5. Specifications shall require Contractor to provide 1/4" = 1' scale layouts of all electrical and data/communications rooms showing panel boards, switchgear, and transformers prior to installation.

6. Specifications shall require installation of electric demand meters/monitors as part of the Building Automation System.

B. Emergency Standby Generator and Automatic Transfer Switch Set, if required:

1. Should contain a built-in load bank for system testing.

2. The emergency generator system shall be designed such that load shedding is not required to pick up the connected loads. Connected loads shall be limited to code requirements and operational requirements. The generator set shall be large enough to successfully start and carry all connected loads. Ten percent spare capacity shall be provided at the emergency generator to carry future loads, unless directed otherwise by DPWES.

3. Primary tanks and day tanks shall not be located or mounted on the same frame of the emergency generator. The daytank shall be mounted on a slab on grade, independent of the emergency generator. Simplex daytanks are preferred; Tramont daytanks are not acceptable. For exterior day tank,

provide day tank heater and heat tape on fuel lines. A secondary fuel pump shall be provided for the return line from the day tank, as required.

4. Package units with main fuel tanks, sub-base fuel tanks, belly tanks, on-board tanks or rail mounted tanks are not acceptable. All fuel piping and fuel tank designs should be approved by the system manufacturer of the generator set. Copper piping is not to be used for fuel supply or return. Fuel oil return piping must be provided to the daytank and the main tank.

5. The main fuel tank shall be a separate component, and shall either be a buried double wall tank or an approved above ground storage tank (AST) mounted on a slab independent of the generator. The AST shall be securely bolted to the slab and properly grounded.

6. Fuel system piping shall be black pipe, painted with corrosion resistant paint. Fuel piping return line must be properly sized per manufacturer's recommendations.

7. The emergency power distribution should be tapped ahead of the main and shall have a disconnecting means with lock out capabilities for service and repairs.

8. Where a buried fuel tank is used, a foot valve shall be provided at the tank's lowest point, to prevent air from entering the system.

9. Where a diesel generator set is used, provide a foot valve in the tank at the pipings lowest point, to prevent the possibility of air getting in the system.

10. Verify that the emergency generator system will work properly with a UPS connected to equipment tied to the system.

11. Locate generator exhaust as far from building air intakes as possible.

12. Specifications shall require the Contractor to conduct an on-site load bank test for new emergency generators, and test result must be submitted to the County (FMD).

13. A GFCI protected receptacle shall be installed on the generator frame, inside the housing, for use during maintenance.

14. A non-fusible disconnect shall be provided adjacent to the generator, connected to the load side windings, for use as a service switch during maintenance and load testing.

C. FIRE ALARM SYSTEM:

1. The installer of the fire alarm and fire suppression systems shall provide four complete sets of Maintenance and Operation manuals, parts manuals,

and list of local vendors for the system, to Fairfax County at Substantial Completion (coordinate with General Conditions).

Contractor must turn over fire alarm system keys, operations and maintenance manuals, and as built drawings at or before Substantial Completion (coordinate with General Conditions).

2. As-built prints, as-built schematic diagrams, wiring diagrams, keys to cabinets and panels, manual stations and access codes shall be submitted to Fairfax County at Substantial Completion (coordinate with General Conditions).

3. The contractor shall provide a system for which repair parts and service is readily available to the County from local vendors. The County should not be bound to an exclusive vendor for repair, maintenance or material procurement for the system or its components.

4. Fire alarm devices vary widely in their electrical characteristics and must be carefully matched with a suitable control panel to assure proper performance. Fire alarm devices, control panel and annunciator panel must be from the same manufacturer.

5. All fire alarm devices shall be readily accessible for testing, repair and maintenance purposes. All fire alarm devices located above a suspended ceiling must be clearly labeled at the ceiling. An LED light must be provided at the ceiling to show annunciation of that device, and access must be provided through the ceiling.

6. Smoke detectors shall not be located adjacent within three feet of supply or return air vents/diffusers.

7. The contractor shall be required to provide the County with replacement initiation devices and audio-visual devices, equaling 10 percent of the total number of installed devices but not less than one of each type device, within seven days of Substantial Completion.

8. The specifications shall require that the Fairfax County Project Manager and Project Engineer (Project Manager to coordinate with FMD) be informed at least 7 days in advance of the final complete test of the entire system and be allowed to witness the tests prior to the acceptance by the County. Testing shall consist of, at a minimum: smoke and alarm each smoke and duct detector, pull and reset each pull station. Specifications shall require that the Contractor provide a complete overview of the system at the time of this system test (CMD shall notify FMD fire alarm staff of the date of this test/training.)

9. The installer shall maintain the color-coding established by the manufacturer throughout the system. The terminations or connections in the control panels or junction points should be clearly marked and the corresponding field wiring should be permanently tagged.

10. Two dedicated telephone outlets are required for each auto-dialer.

11. The phone lines serving the auto-dialers shall not be hard wired; a jack shall be provided for each line to facilitate maintenance and testing.

12. Auto-dialer program and format codes shall be transmitted to FMD at the Substantial Completion walk through and a copy shall be included in the operations manual for the fire alarm system.

13. An auto-dialer shall be provided and connected to support the Fire Alarm Control Panel (FACP). The auto-dialer shall connect to the Counties contracted monitoring service as directed by FMD, PE&E section.

14. The auto-dialer, which serves the FACP, shall not serve other equipment.

15. The auto-dialer, which serves the emergency phone for elevators and lobbies, shall not serve other equipment.

16. The auto-dialer, which serves the security system, shall not serve other equipment.

17. Projects, which require an elevator, shall be provided with an auto-dialer, and connected to the emergency phones in the elevator cabs and elevator lobbies. The auto-dialer shall connect to the Counties contracted monitoring service as directed by FMD, PE&E section.

18. The FACP and the Fire Alarm Annunciator Panel (FAAP), and auto-dialer shall be programmed and or designed to automatically reset once a trouble or fault is cleared, as required by the local agency having jurisdiction.

19. The auto-dialer for the Fire Alarm system and the Elevator emergency phones shall have manual onsite reset capabilities, and shall automatically reset once the trouble or phone line or power interruption has cleared.

20. The auto-dialers shall automatically restore and or reset upon power or phone line interruption, once the power or the phone line restores and or stabilizes.

21. The auto-dialers shall be programmed to monitor/report events as required by the Fire Marshall's office. These events shall be sent via the dedicated phone lines to the Counties contracted monitoring company as directed by the FMD.

22. The auto-dialer test timer test shall be programmed to perform between 7:00 A.M. and 1:00 P.M.

23. The contractor shall arrange to receive and respond to all trouble and alarms received by the Counties monitoring service prior to building occupancy by the County.

24. The contractor shall transmit a copy of the Fire Marshall's final inspection report to FMD, O&M Branch for inclusion into the building maintenance file. This report should be provided to FMD prior to building occupancy by the County.

25. A Knox Box is required by the Fire Marshall's office for key access to buildings (see Attachment 08000-A). The contractor shall provide, install,

and coordinate location with the Fire Marshall's office, all required Knox boxes.

26. Architect must obtain the most current copy of the Code Reference Package for Architects, Engineers, Designers and Installers from the Fairfax County Fire & Rescue Department, Fire Prevention Division, Engineering Plans Review Section, and shall incorporate all requirements of that Code Reference Package into the design documents. All requirements of the Code Reference Package which are intended to be the responsibility of the Contractor shall be clearly identified as such in the contract documents.

27. Specifications must clearly state that the Contractor is responsible for paying for all shop drawing review fees and permit fees associated with the review, approval and permitting necessary for a complete fire alarm system. The Contractor shall also pay any additional costs for Fire Marshall's inspection's beyond those paid for by the Owner as part of the building permit/inspection fees.

D. LIGHTING

1. Lighting shall be designed for the foot candle levels listed below, with task lighting provided to supplement where higher levels are desired. All fluorescent lights shall be provided with 32-watt T-8 lamps and electronic ballasts. Recommended light fixtures are: 2 x 4 lay-in with parabolic louvers, three tubes (277 volts).

2. Light fixtures used as HVAC diffusers are not acceptable. These type fixtures limit the flexibility of the lighting system.

3. Lighting in atrium areas or in high ceiling areas should utilize HID fixtures with remote ballasts locked in a properly ventilated area. Ready access to all light fixtures is essential to properly maintain the designed lighting levels. Fixtures in high ceiling areas should be accessible from a ten-foot stepladder. Fixtures that are not readily accessible are not acceptable.

4. The use of incandescent fixtures is prohibited except when specifically approved by the Project Manager, and FMD

5. Dimming systems should not be used unless specifically required. Automatic dimming systems should be utilized in areas where "daylight" may provide all or most of the required light level.

6. Decorative, accent and neon lighting should not be used, without specific approval from the Project Manager.

7. All exterior lighting should be controlled by photo controls. The lighting controls, clocks and photo controls should be located in the main electrical room. Parking lot lighting should be provided and maintained by the local utility. Outdoor walkway lighting will be provided and maintained by the Owner and included as part of the design documents. Bollard type fixtures should not be used because they are a constant maintenance liability due to vandalism. Lighting for flagpoles should be attached to the building structure. The use of outdoor, in-ground lighting is not acceptable due to vandalism. Plans must show Contractor provided conduit for all site lighting circuits. The use of UF cabling for exterior lighting is not acceptable. All

circuits for exterior lighting shall be routed in conduit.

8. The mechanical and the electrical room lighting shall be on the standby emergency generator.

9. Where appropriate, the fuel site lighting and the power should be on the emergency generator.

10. Lighting fixtures with battery backup are not acceptable; except for emergency lighting, fixtures with battery back-up, which should be dual head, flood type fixtures (for ease of maintenance).

11. In libraries where stack lighting is to be used, there should be no ceiling light provided where it becomes inaccessible for maintenance or repairs.

12. Where low voltage controls are incorporated for local switching, a layout of the relays should be permanently placed in the facility's main electrical room and should be clearly identified.

13. Fire station hose towers should be properly illuminated for safe use for storage. The fixtures shall be water tight and accessible for repairs.

14. Day lighting or indoor electrical illumination should comply with the following standards:

Corridors, Lobbies and Means of Egress	20 foot candles20 foot candles
Storage Area	20 foot candles
Waiting Rooms and Lounge Areas	(task illumination with maximum back ground lighting):
General Office Areas	60 foot candles
Desk tops	30-50 foot candles
Conference Tables	60 foot candles
Secretarial Desks	30 foot candles
Filing Cabinets	30 foot candles
Book Shelves	70-100 foot candles
Drafting and Accounting	100 foot candles
Public Spaces:	
Library Reference Areas	70 foot candles
Library Reading Areas	30 foot candles
Auditoriums	30 foot candles
Cafeterias	In accordance with Illuminating Engineering
Parking Structures	Society Guidelines

15. Lighting in high bay areas such as garages, gymnasiums or warehouses should use pendant type HID type fixtures and should be easily removable for repair or replacement. Cord and plug connected is preferred. Safety chains must be provided on each fixture.

16. The site lighting shall be installed by Dominion Virginia Power under the Municipal Street lighting contract.

17. Exterior building and walkway lighting not installed and maintained by Dominion Virginia Power must be durable and vandal resistant. Metal bollard fixtures are not acceptable.

18. All wall mounted lighting control switches (and other similar wall mounted control switches) shall be toggle type switches. Rocker type switches shall not be used.

E. COMMUNICATIONS ROOMS

1. Communications Rooms for telephone, data, cable television, etc., must be separate from electrical rooms. No transformers or electrical distribution panels are permitted in Communications Rooms. See attachment 16000-A for typical communications room layout.

2. Flat wire systems are not to be used for communications systems

3. All communications rooms shall be provided with HVAC systems capable of maintaining the temperature of the closet between 64^{o}F and 75^{o}F.

4. Provide a number six (#6) ground wire run from a buss bar in each communications room to the main building ground in accordance with NEC. See Attachment 16000-C for buss bar detail.

5. A minimum of one communications room shall be provided at each floor of a facility, with additional rooms on each floor as may be required to accommodate the communications equipment and wiring requirements. Any exceptions to this requirement must be approved by the project manager. Telecommunications closets are to be sized in accordance with Electronic Industries Association/Telecommunications Industries Association (EIA/TIA) 569 Chapter 7. No cable run can be longer than 295 feet from the telecommunications closet.

6. All communications systems rooms, switch rooms, equipment, materials, wiring, and ancillary provisions shall be designed and constructed in accordance with all requirements and recommendations of the EIA/TIA Electronic Industries Association/Telecommunications Industries Association (EIA/TIA) Telecommunications Standards. Requirement for compliance with this document must be reflected on project plans and specifications.

7. Communications rooms must be of adequate size to accommodate the following requirements for County telephone, data and cable television, but in no instance shall they be smaller than the referenced standards. See Attachment 16000-B for typical communications room layouts. Additional provisions may need to be made for other communications systems.

   a. All available wall space at communications rooms should be covered with 3/4" x 8' high fire retardant, plywood backboards. Provide a minimum of four (4) sheets of painted, wall mounted 4'x 8'x 3/4" fire retardant plywood to meet requirements for County telephone, data and cable television. Additional backboards may be required for Verizon Communications and other communications systems. All backboards are to be painted white using a non-volatile, fire retardant paint that is compatible with the fire retardant plywood

b. Provide a minimum of four (4) quad 110-volt, 20 amp dedicated electrical outlets with isolated ground mounted at 6 inch AFF.

c. Provide overhead two-tube fluorescent lighting fixture(s) with coverguard and a separate wall mounted switch. At least one light per closet, which shall be tied to emergency power. Lighting levels must meet EIA/TIA standards. Minimum of 50 foot candles at 3 feet.

d. Provide floor space for two (2) - 24" wide by 36" deep by 79" high floor mounted, telecommunications equipment racks, and provide NEC required 36" access clearance.

e. Allow for a minimum of three feet of clear space on all sides of all electrical/ communications equipment per NEC.

8. Provide a 3/4" empty conduit with drawstring for each telephone, answering machine, fax machine, copy machine and computer data jack location. Telephone and data jacks for computer at the same location can utilize the same 3/4" conduit for wiring. Provide a 1" empty conduit with drawstring for each cable television (CATV) outlet. Provide a single *gang* electric box at each telecommunications/data and CATV outlet. Provide an appropriate size empty conduit stubbed above ceiling for accessible ceiling areas, and provide entire conduit system from telecomm/data and CATV outlet locations back to closet for inaccessible ceiling areas or security type areas. Provide empty conduit and boxes in concrete slabs for free standing furniture areas that will require communications outlets. *Provide Walker products for all floor box and poke through locations (see* www.wiremold/topguard*).* An accessible wiring path must be provided from each jack back to the communications room, independent of the electrical circuits. Communications conduit requirements must be clearly shown on the electrical drawings including pull boxes. "Daisy-Chaining" or wiring of jacks in series is not acceptable.

9. Provide a minimum of five (5) four-inch empty conduits vertically and horizontally between communications rooms that will be wired in series. The number, location, and routing of these conduits is to be approved by the Project Manager prior to construction. An additional four-inch empty conduit run vertically and horizontally between communications rooms will be required for each communication system other than County telephone, data and cable television. Provide two (2) four-inch conduit(s) for Verizon and Cox CATV (four conduits total) from the main telecommunications room to the property line.

10. A system of accessible pull boxes which can be used as a junction point for several dedicated 3/4" conduit runs and which provides a property sized home-run conduit with drawstring from the pull box to the nearest communications room may be provided. This pull box and conduit system must comply with EIA/TIA; be approved by the Project Manager, and be shown on the construction documents. Locations for bushed, wall-sleeve , penetrations shall also be shown on the plans, as required.

11. Make provisions for dedicated telephone/data jacks at location of mechanical EMCS station, and at the communications closet for the fire alarm direct dialer for remote emergency monitoring.

12. All telephone, data and cable television jacks, wiring and cover plates will be furnished and installed by Owner. Empty conduit with pull strings, pull boxes, junction boxes and fit-up of communications closet with plywood, ground wire and buss bar, and electric outlets will be by Contractor.

13. All building wiring, pathways and space, grounding and bonding shall meet or exceed the EIA/TIA Telecommunications Infrastructure Standards. Project specifications shall include a separate section to address telecommunication infrastructure requirements. The following document numbers must be complied with:

EIA/TIA-569A:	Commercial Building Wiring Standard
EIA/TIA-569:	Commercial Building Pathway and Space Standard
EIA/TIA-606:	Telecommunications Administration Standard
EIA/TIA-607:	Commercial Building Grounding and Bonding Standard
EIA/TIA-TSB-67:	Testing for Telecommunications:
Technical Bulletins	TSB-36, 40, and 53

EIA/TIA Telecommunications Infrastructure Standards is available from:

Electronic Industries Association
Engineering Department
2000 Pennsylvania Avenue, N.W.
Washington, D.C. 20006
(202) 457-4966

F. LIGHTNING PROTECTION/GROUNDING SYSTEMS

1. Contractor must submit detailed, as-built drawings for this system. As-builts must show down rod locations, conductor routing and conductor connections sites. A copy of the UL certification for the lightning protection system must be included in the O&M manuals.

2. Contractor must submit as-built drawings for the building grounding system including rod sizes, locations, configuration and connection details.

3. Specifications shall require that the contractor obtain a UL certification for the system and submit a copy of the certificate to the Architect/Owner.

G. OUTDOOR RECEPTACLES

1. Use of outdoor receptacles should be minimized. Where provided, outdoor receptacles shall be designed to limit access to authorized personnel only.

PRODUCTS

A. ELECTRICAL MAIN SERVICES:

1. Main distribution panels, sub panels and disconnects shall be Cutler Hammer. FPE and Challenger are not acceptable. Cutler Hammer type PB panels are preferred with bolt in breakers. The type PB panels give flexibility by accepting both bolt-in and push-in breakers. Provide one stock circuit breakers for each type installed.

2. The use of aluminum cable is unacceptable. Provide only copper cable.

B. WIRING SYSTEMS:

1. Where a floor wiring system is required, a walker duct type floor system with separate trough for electrical, computer and communication wiring is recommended. Flat wire systems are not desirable and shall not be included in the design without prior approval of the Project Manager (flat wiring must be approved in writing by the Telecommunications Division of the Department of Information Technology). Where flat wire systems are necessary, the type FCC cable system is preferred.

2. The County stocks replacement material and has the tools necessary to repair and install Thomas and Betts type FCC (Flat Cable) system. The use of other than Thomas and Betts type FCC system will require the installer to provide the County with an appropriate quantity of spare materials to make repairs to the system and the special tools necessary to make the repairs.

C. EMERGENCY STANDBY GENERATOR AND AUTOMATIC TRANSFER SWITCH SET:

1. The emergency generator set, if required, shall be Onan, Caterpillar or Katolight. No others are acceptable.

2. The use of a Detroit V-12 engine is not acceptable.

3. Automatic transfer switch manufacturers shall be Zenith Russel Electric, or Asco.

D. FIRE ALARM SYSTEM

1. The acceptable manufacturers for fire alarm devices, control panels, and annunciator panels are Simplex, Cerberus, and Edwards. Only listed graphic fire alarm annunciator panels (1990 BOCA 1016, 1017; NFPA 72A 1-2,2) are to be installed. See Attachment 16000-A for sample annunciator panel. All devices connected to the Fire Alarm Control Panel (FACP) shall be by the same manufacturer as the FACP.

LIST OF ATTACHMENTS

01000-A Fairfax County Office Space Standards

01000-B Guidelines for Design of Trash and Recycling Rooms, and Dumpster Space Requirements

02000-A Section 313 of Fairfax County Fire Prevention Code

08000-A Fire Department Access System [Lock Box]

10000-A Janitor's Closet Detail

16000-A Telecommunications Room Layouts

16000-B Buss Bar Detail (revised attachment)

FAIRFAX COUNTY OFFICE SPACE STANDARDS

CATEGORY	TITLE	SQUARE FOOTAGE
Group A	Director	240 *
Group B	Director & Asst. Director	180 *
Group C	Director, Asst. Director and Branch Chief	120 *
Group D	Professional Staff	100 **
Group E	Professional & Technical Staff	64 **
Group F	Technical & Clerical Staff	48 **
Group G	Temporary & Shared Computer Workstations	30 **

* Fixed Wall Office – furniture layouts and office configurations shown are examples only For Groups A-C

** Systems Furniture Workstations

*** *Delete reference to Allocation List*

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Department of Public Works
Division of Solid Waste Collection and Recycling
12000 Government Center Parkway, Suite 458
Fairfax, VA 22035-0060

Recommended Practices for Commercial Trash and Recyclables Handling

Custodial Contracts:

- Containers for staging putrescible materials within the building should be of leak proof, nonporous construction, with no gaps or seams over ½ inch.

- Refuse containers should use removable plastic liners of minimum 1.0 mil thickness. Liners are optional for recycling, but ease collection. Recyclable office paper is removed from collection containers and transferred into roll-out carts, exchanging empty carts for full ones as recyclable paper is placed into a compactor held in fire-rated storage areas.

- F-2103.4 of the Fire Prevention Code requires that all loose combustibles not in fire resistant containers with tight fitting lids be removed from the building **daily** unless staged in a fire-rated or sprinklered storage area.

- Custodial contracts should provide monthly cleaning and sanitizing of all trash containers staged within the building, removal of spillage and emptying of work area trash and recycling containers a minimum of 3 days per week. Friday collection from interior building spaces should be required to avoid storage of refuse over weekends.

- Trash and recycling rooms should be cleaned and sanitized every 4 months by steam cleaning or other means approved by the Director of Environmental Health.

Internal Collection System:

- The recycling collection system within the building should include central collection containers for office paper in copier and printer rooms and other major generation areas.

- A minimum of one 96-gallon roll-out cart for mixed paper is recommended for each 5000sf of occupied floor area, or 50 employees, whichever occurs first.

- If recycling carts are emptied directly into a dumpster or compactor, the receiving equipment should be clearly marked to identify it as a recycling unit; “Recyclable Paper and Cardboard Only, No Trash”

- Recycling containers should be different and readily distinguished from those used for refuse.

Staging Containers and Equipment:

- Six-cubic-yard dumpsters are best if the materials must be side-loaded from on-grade. Eight cubic-yard containers provide somewhat more capacity if they can be top-loaded from above; because this enables some settling of the material as it is deposited.

- Large office buildings over 100 sf, which opt to collect mixed paper and corrugated cardboard, should have a loading dock area large enough to accommodate either two stationary compactor units (one 33 cubic-yard container for recyclable paper and one 20 cubic-yard container for trash) or a combination of compactor units and dumpsters.

ATTACHMENT 01000-B.1

Material Staging Containers and Equipment: (Continued)

- It is recommended that the largest container(s) be used for storage of recyclable mixed paper and cardboard because the volume of these materials usually exceeds that of refuse requiring disposal. Section 109-5-3 of the Code of the County of Fairfax requires that refuse containers be emptied weekly, whether full or not. Recycling containers can be held until full, so using the larger container for recyclables minimizes collection costs by reducing the frequency of collection.

- If tenant recycling participation is encouraged and well monitored, a single eight cubic-yard dumpster emptied daily (or less often as needed) usually provides adequate refuse storage capacity for office buildings up to 75ksf. However, if recyclable cardboard is disposed in trash instead of being recycled, the refuse container quickly overflows. Failure to monitor the recycling program may require placement of an additional dumpster and/or more frequent collection which incurs additional expense.

- If building staff are unable to monitor tenant recycling participation in large office or mixed use buildings of over 150ksf, a second compactor for refuse is more cost effective than daily collection of multiple refuse dumpsters. In order for compactor units to be more cost-effective than dumpsters, weekly volume should equal or exceed 60 cubic yards (two 6cy dumpsters, collected 5 days weekly).

- Your company will be best served by securing bids for several equipment scenarios to give flexibility in evaluating bids and making changes after the program begins.

Engineering Requirements for Design of Staging Areas For Solid Waste and Recyclables:

- Trash and recycling rooms must be either: 1) separated from the rest of the building by 2-hour fire rated construction or; 2) protected by automatic sprinklers designed for Ordinary Group 2 Hazard per NFPA Standard 13-1994.

- Required clearances for safe access by rear-loading refuse packers collecting trash or recyclables set out in roll-cart carts, trash and recycling storage and collection areas are 13 ft. overhead, and 10 ft. width of clear opening. Recommended practice is to further provide 42 ft. of unrestricted approach to the containers and a 55 ft. turning radius.

- Required clearances for safe access by front-end loading packers collecting trash or recyclables stored in dumpsters are 23 ft. overhead and 10 ft. width of clear opening. Recommended engineering practices are to further provide 45 ft. of unrestricted approach, 66 ft. turning radius and dumpster pads to be 6 ft. longer than the depth of the trash or recycling container, maintaining 3 ft. clearance around all sides of the container and constructed of Class 20, steel reinforced concrete, 6 in. thick.

- Required clearances for safe access by roll-off trucks pulling stationary compactors and roll-offs are 17 ft. overhead for entry of the truck only, 24 ft., when the truck hoist is raised with a rectangular box container and 11 ft. width. Recommended engineering practices are to further provide compactor pads 10 ft. wide, 6 ft. longer than combined length of stationary compactor and container, constructed of Class 20, steel reinforced concrete, 6 in. thick with 66 ft. unrestricted approach for loading and unloading.

- Collection containers described by Section 109-5-5(e) of the *Code of the County of Fairfax* shall not obstruct access to sanitary sewer manholes. A clear zone is required for a distance of 3 ft. around the rim of any sanitary sewer manhole cover to provide access to the sanitary line in the event of an emergency and an area for erection of equipment for safe entry into the manhole.

	FAIRFAX COUNTY FIRE AND RESCUE PREVENTION DIVISION POLICIES, OPERAITONS AND PROCEDURES	**EPR-003**
	ISSUED BY: REISSUE DATE: JANUARY 1, 1999 **DEPUTY FIRE CHIEF CLARK O. MARTIN, JR**	
	SUBJECT: **DESIGNED REQUIRMENTS FOR PROJECT SITE PLAN INDICATION OF FIRE LANE MARKINGS AND SIGNS**	

TO: All Contractors, Engineers, Architects, Designers, and Installers

The Fairfax County Public Facilities Manual requires the installation of fire lanes as part of the public utilities requirements. The Fairfax County Fire Prevention Code governs the dedication of the fire lane as well as the installation and sign specifications.

Posting and marking of fire lanes was required as of July 1986, for all sites regardless of Use Group classification. Under certain situations, additional areas may be designated as fire lanes as conditions warrant.

All fire lane information must be applied in a clear and orderly manner to the original mylar. All fire lanes must be shown on a site plan that is part of the site plan submittal set and all sets must have the fire lane plan included. The site plan scale can be no smaller than 1:500 (metric). Street names and building addresses are to be shown. Plans submitted must indicate fire lanes designated in accordance with Fire Prevention criteria. A summary of the information necessary to create fire lanes acceptable to Fairfax County Fire and Rescue is on the following pages.

Attachment 02000-A.1

FIRE LANE DESIGNATIONS

Under Section F311.0 of the Fairfax County Fire Prevention Code, the Office of the Fire Marshal is authorized to designate fire lanes on public streets and on private property where necessary. This is to prevent parking in front of, or adjacent to, fire hydrants and to provide access for fire fighting equipment. Markings and signs are to be provided by the owner or agent of the property involved. Parking or otherwise obstructing such areas is prohibited.

I. HYDRANTS

A. Parking is prohibited within 4.6 m. of a fire hydrant located along the curb line or edge of any public or private roadway. No special curb marking is required for enforcement.

B. Fire hydrants installed in parking lots are located within a fire lane. Curb and/or roadway marking is required in accordance with sections III and IV below.

II. FIRE LANES

A. Fire lanes shall be installed where required by the Office of the Fire Marshal. Fire lanes shall be marked with both sign and curb delineation per section III and IV below. Parking and traffic flow patterns shall be required as follows:

STANDARD REQUIREMENTS

Street Width Curb to Curb	One-Way Traffic	Two-Way Traffic
less than 7.2 m.	no parallel parking on either side of street	no parallel parking on either side of street
7.2 m. to 8.7 m.	parallel parking on one side as decided by Fairfax County Office of Fire Marshal	no parallel parking on either side of street
9 m. to 10.5 m.	parallel parking allowed on both sides	parallel parking on one side as decided by Office of Fire Marshal
10.8 m. or greater	parallel parking allowed on both sides of street	parallel parking allowed on both sides of street

III. SIGN SPECIFICATIONS

A. Metal construction, 305 mm x 457 mm
B. Red letters on reflective with background with 10 mm red trim strip around entire outer edge of sign.

Attachment 02000-A.2

C. Lettering on sign to be: "NO PARKING OR STANDING FIRE LANE"
D. Lettering size to be as follows: "NO PARKING" and "STANDING" - 50 mm, "OR" - 25 mm, "FIRE LANE" -63 mm, arrows 25 mm X 150 mm solid shaft with a solid head 38 mm wide and 50 mm deep.
E. Signs are to be mounted 2.1 m. from the ground to the bottom of the sign unless otherwise directed by the Office of Fire Marshal.
F. Posts for signs when required shall be metal and securely mounted, unless written permission for alternatives is obtained prior to installation from the Office of Fire Marshal. Signs should be spaced as on approved plans. In long stretches the maximum distance between signs is 21 m.
G. Other special signs as approved by the Office of the Fire Marshal.

IV. CURB DESIGNATION

A. All curbs or paved spaces designated as fire lanes shall be indicated yellow paint approved by the Office of Fire Marshal. In areas without curbing, a 150 mm wide yellow stripe shall be applied to the edge of the pavement. Paint shall be highway traffic grade.

SIGN TYPE "A"	**SIGN TYPE "C"**	**SIGN TYPE "D"**
Standard wording with an arrow at bottom pointing to the right. One sign mounted parallel to the line of curbing or pavement edge at end of painted area.	Standard wording with an arrow at bottom pointing to the left. One sign mounted parallel to the line of curbing or pavement edge at end of painted area.	Standard wording with no arrow. Two signs, back to back, mounted perpendicular to line of curbing or pavement edge.

Fire lane markings, types of signs, locations, etc.
shall be subject to the approval of the Office of the Fire Marshal.

Attachment 02000-A.3

V. INSPECTION NOTICE

A. The following notice must appear on the site plans:

1. Fire Marshal field inspection necessary for final approval of fire lanes. Fire lanes must have final approval prior to request for occupancy permit.
2. Owner shall notify the Fire Prevention Division, Fire Lanes Section, 4100 chain Bridge Road 4th Floor, Fairfax, Virginia 22030 (703-246-4821) when fire lanes have been installed.

VI. OTHER NOTICES TO BE SHOWN AS NEEDED

A. Notes for fire department access lanes:

1. To be an all weather surface designed to support fire department vehicles.
2. To be identified as a fire lane at entrance.
3. To be maintained clear and accessible all year.
4. To have mountable curb at entrance.
5. Provide manufacturer's specifications and installation instructions for items used in access lanes to Fire Marshal's office prior to installation.
6. Installation of access must be witnessed by Fire Marshal's Office. Please call for an appointment.
7. Provide approximately 1.2 m. high bollards with steel chain locked in between at curbside entrances to access lanes.
8. Access lanes must be clearly delineated for entire length and at ends by shrubs, lights, etc.

One copy of the approved site plans will be retained by the Fire Prevention Division for future reference.

	FAIRFAX COUNTY FIRE AND RESCUE PREVENTION DIVISION POLICIES, OPERAITONS AND PROCEDURES	**EPR-016**
	ISSUED BY: **REISSUE DATE: JANUARY 1, 1999** **DEPUTY FIRE CHIEF CLARK O. MARTIN, JR**	
	SUBJECT: **FIRE DEPARTMENT ACCESS SYSTEM**	

TO: Engineers, Designers & Architects

The Fairfax County Fire Prevention Code, F-504.10, requires the installation of an approved emergency building with the exception of single family dwellings. Key boxes manufactured by the Knox and Supra companies are currently approved.

- The key boxes must be installed at the primary fire department entrance (main entrance or entrance nearest to the fire control room).
- The key boxes must be visible and accessible.
- The key boxes must be installed 42 inches to 54 inches above finished grade.
- Boxes shall be installed prior to occupancy.

Literature on the boxes can be obtained from the Fire Prevention Division Revenue & Records Branch at (703) 246-4800, or picked up at the main reception area located at 4100 Chain Bridge Road 3rd Floor Fairfax, Virgina.

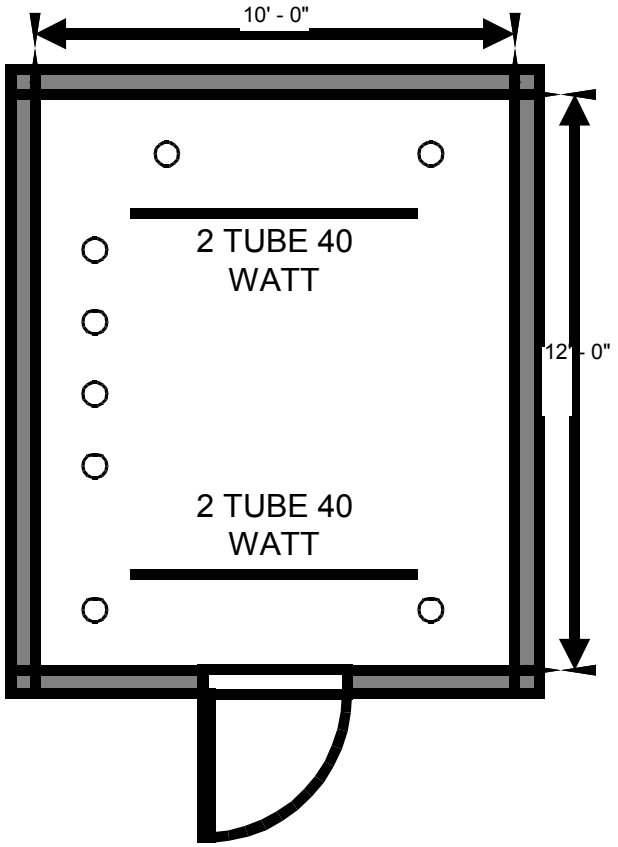
ATTACHMENT 08000-A

STANDARD JANITOR'S CLOSET REQUIREMENTS

GENERAL NOTES:

1. ONE STANDARD CLOSET TO BE PROVIDED PER 25000 SQ.FT. OF GROSS FLOOR AREA. MINIMUM OF ONE CLOSET PER FLOOR.
2. WALLS TO BE DUROCK, HARDYBOARD OR EQUAL, COVERED WITH VINYL TO 48" AFF. WALLS TO RECEIVE COATING OF SANITILE 550 OR EQUAL ABOVE THE VINYL . CEILING TO RECEIVE ENAMEL PAINTED WALL BOARD.
3. FLOOR SHALL BE SLIP RESISTANT, SEALED CONCRETE.
4. PROVIDE 24" MOP RACK WITH 3 MOP HOLDERS.
5. PROVIDE TWO DOUBLE COAT HOOKS.
6. PROVIDE 2' 4" X 6' 8" DOOR (MINIMUM SIZE).
7. PROVIDE FIVE WALL-MOUNTED SHELVES, 12" DEEP x 48" LONG, 12" ON CENTER VERTICALLY. FIRST SHELF TO BE 18" A.F.F.
8. PROVIDE HEAVY DUTY VINYL OR STAINLESS STEEL CORNER GUARDS AT APPROPRIATE LOCATIONS INCLUDING THE DOOR AND DOOR FRAME.
9. MOP SINK TO BE CONSTRUCTED OF MONOLITHIC, PREFORMED BASIN MATERIAL WITH STAINLESS STEEL SILL.
10. INCLUDE HOSE AND REEL AS PART OF MOP SINK.
11. FAUCET SHALL BE TYPE A/B/E SPECIALTY MOP SINK WITH PAIL HOOK AND WALL BRACE, OR EQUAL.
12. ALL PLUMBING CONNECTIONS SHALL BE ½ MNPS THREADS.
13. LIGHT FIXTURE SHALL BE STONCO VAPOR TIGHT FIXTURE WITH GRILL, OR EQUAL.

ATTACHMENT 10000-A

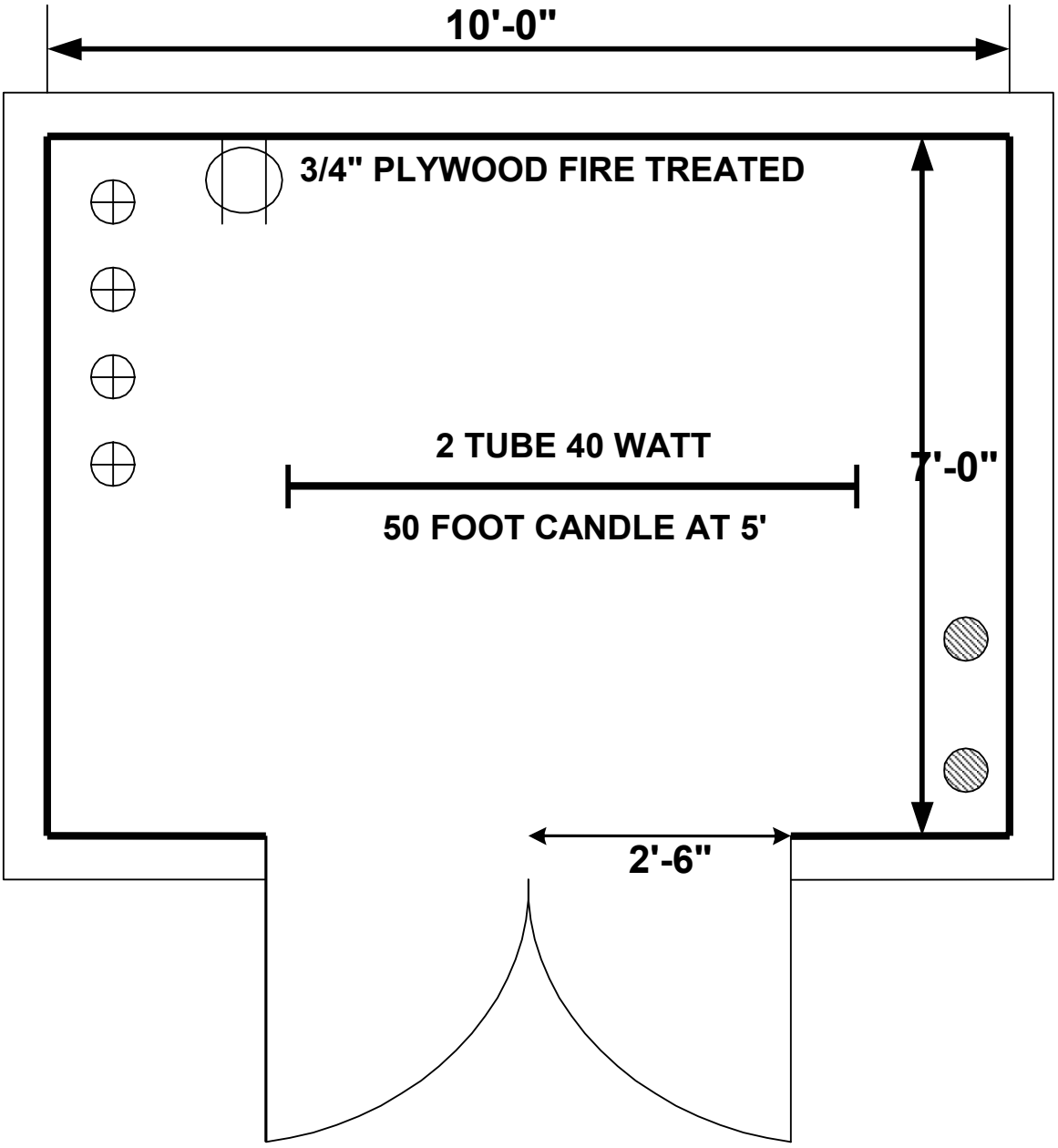


TYPICAL TELEPHONE CLOSET
FLOOR-SERVING PBX
(200 STATION OR SMALLER)

NOTE: PROVIDE THE FOLLOWING

1. Four (4) separately fused 20-amp, 3-wire, 110-volt double duplex receptacle with isolated ground; up 18" from ground to wall.
2. Two overhead 2-tube fluorescent lighting fixtures with switch.
3. 12" ground buss bar with the #6 ground wire to building ground; conforms to NEC code.
4. ¾" plywood with sealed surface; fire rated.
5. Sleeves through floors and ceilings as required.
6. Wall space to be maintained clear and unobstructed for telephone use; walls should be painted white.
7. U.F.D. (Under floor duct) to turn up 3" from wall.
8. Door to open out.
9. Environmental and other electrical requirements to be stated at the time of specific Design.

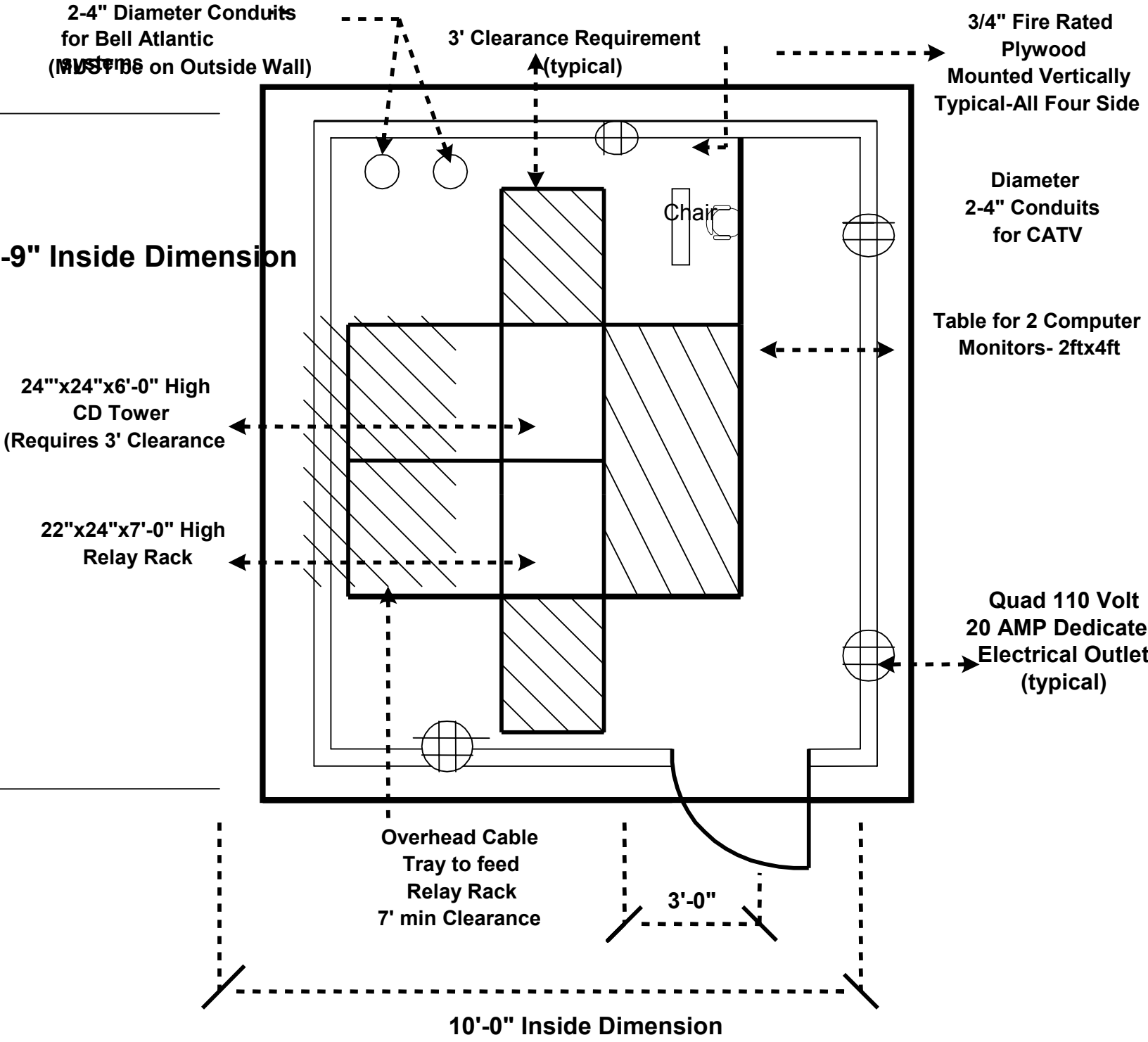
ATTACHMENT 16000-A.1



TYPICAL TELEPHONE CLOSET SERVING ELECTRONIC KEY/HYBRID SYSTEMS

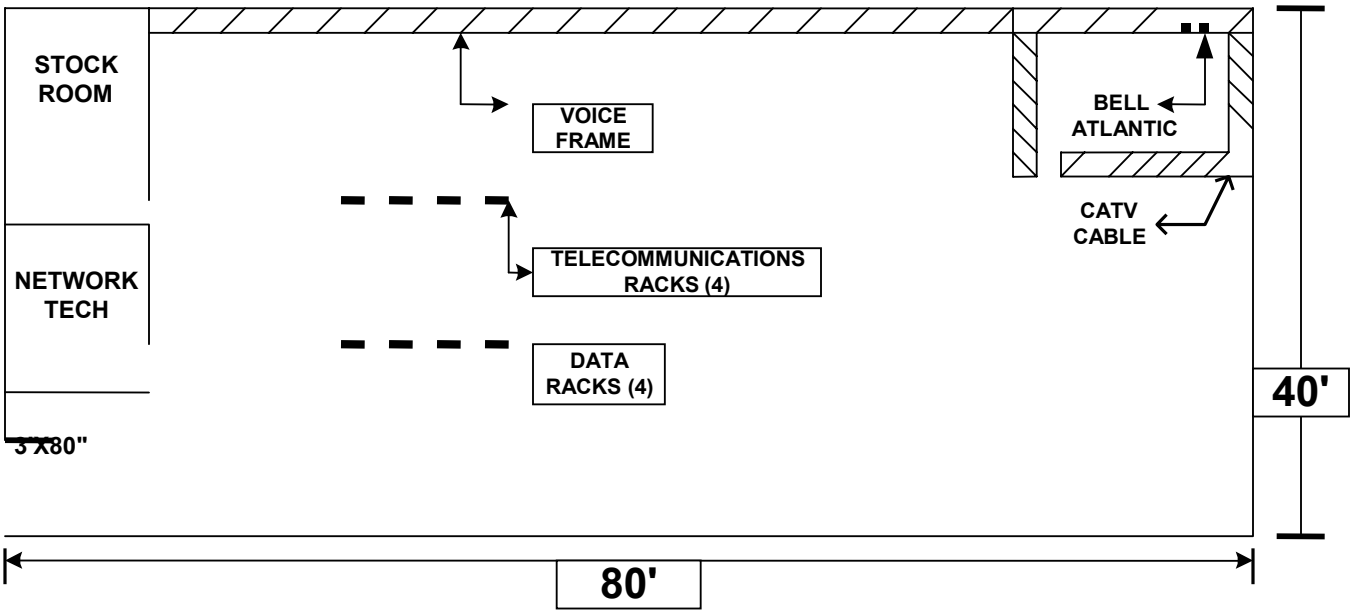
1. Four (4) separately fused 20-amp, 3-wire, 110-volt double duplex receptacle with isolated ground; up 18" from ground to wall.
2. Two overhead 2-tube fluorescent lighting fixtures with switch.
3. 12" ground buss bar with the #6 ground wire to building ground; conforms to NEC code.
4. ¾" plywood with sealed surface; fire rated.
5. Sleeves through floors and ceilings as required.
6. Wall space to be maintained clear and unobstructed for telephone use; walls should be painted white.
7. U.F.D. (Under floor duct) to turn up 3" from wall.
8. Door to open out.
9. Environmental and other electrical requirements to be stated at the time of specific Design.

ATTACHMENT 16000-A.2



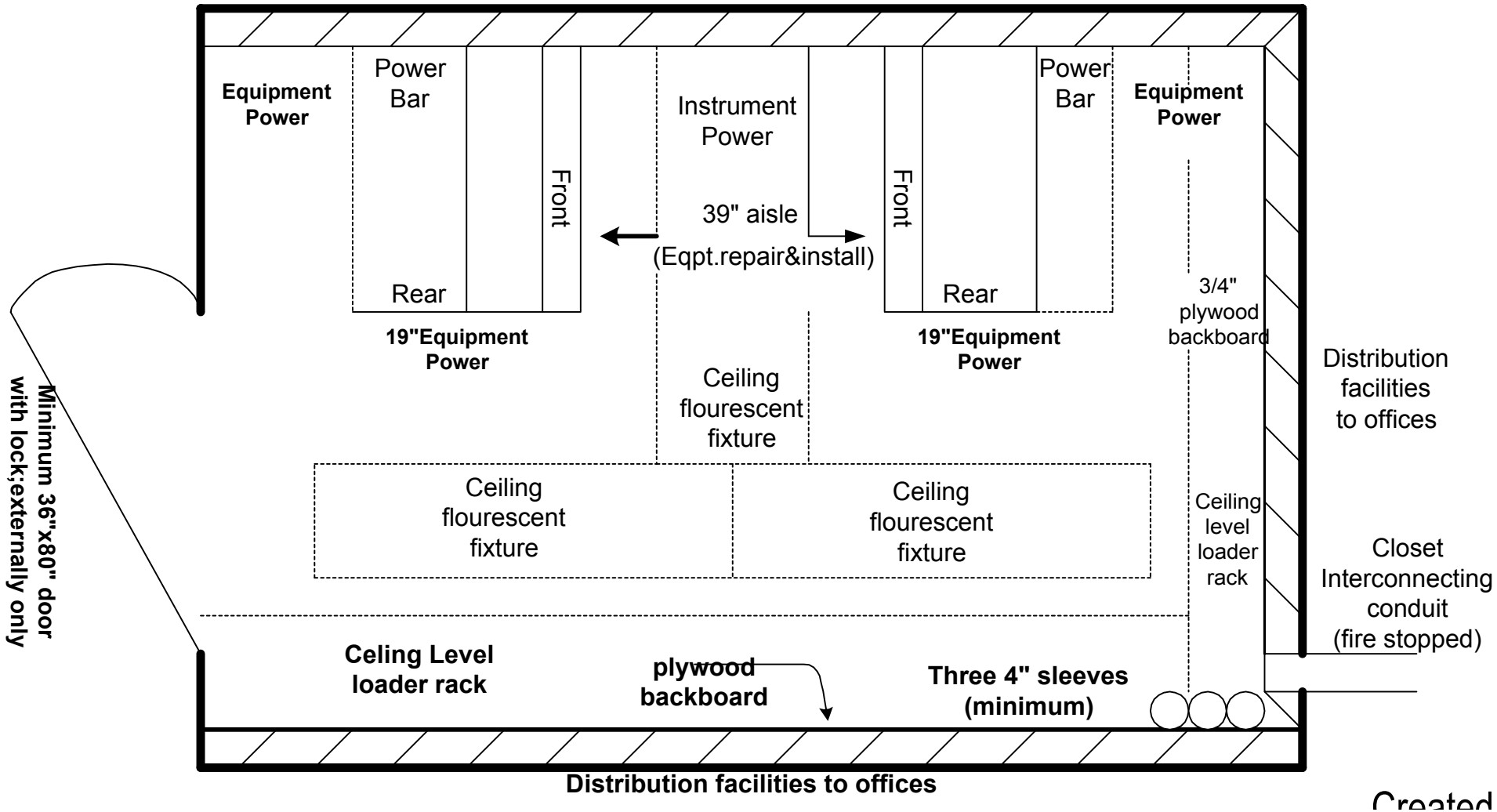
Typical Telecommunications Room

ATTACHMENT 16000-A.3



MAIN TELECOMMUNICATIONS BUILDING ENTRANCE FACILITY

ATTACHMENT 16000-A.4



TYPICAL EQUIPPED TELEPHONE CLOSET

ATTACHMENT 16000-A.5

TYPICAL TELECOMMUNICATIONS ROOM

1. Provide four (4) separately fused, 3-wire, 110-volt quad receptacles with isolated ground. Locate outlets six inches up from ground.

2. Provide two- (2) overhead, two-tube fluorescent lighting fixtures with cover guard and separate wall mounted switch. At least one light must be tied to emergency power. Lighting to provide 50 foot candles at three feet.

3. Provide a 12-inch bus bar with a number 6-ground wire to run from the buss bar to the main building ground in accordance with the NEC code. See attachment for buss bar detail.

4. Provide wall mounted four foot by eight foot by ¾ inch fire retardant plywood on all sides of room. Paint plywood with a non-volatile, white paint.

5. Provide sleeves through floors and ceilings as required for conduits.

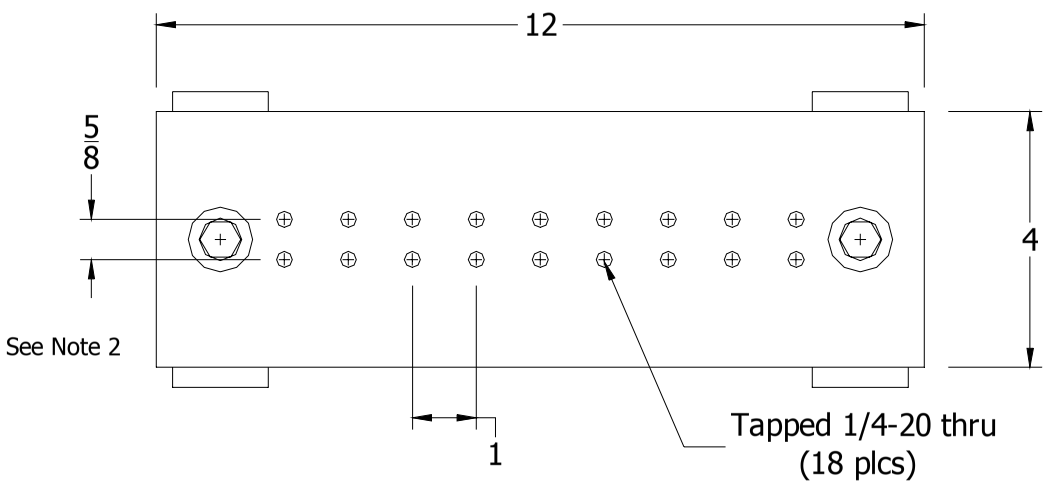
6. Turn up U.F.D. (under floor duct) three inches from the wall.

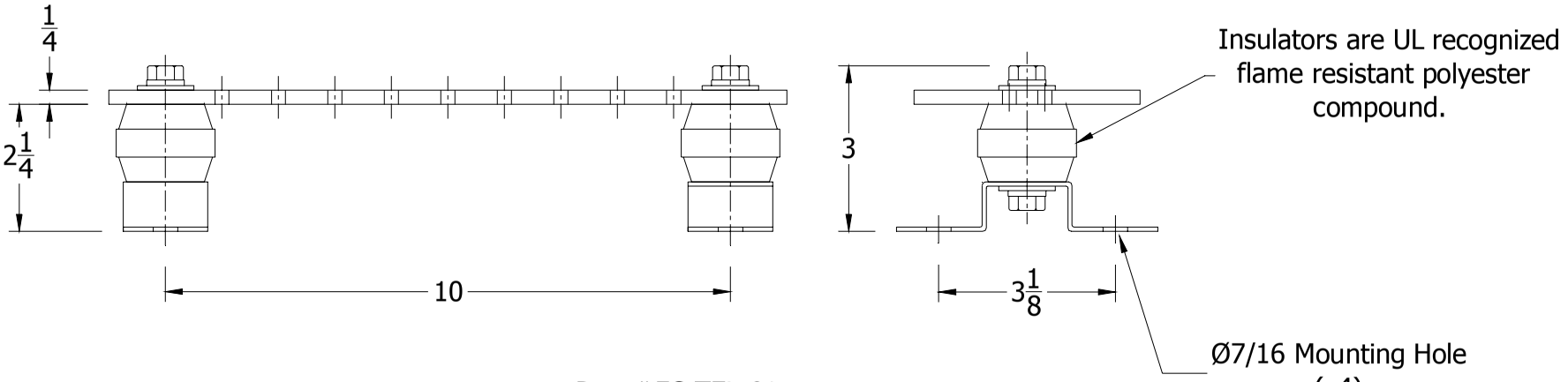
7. Design door to open out of telecommunications room.

8. Provide HVAC system capable of maintaining a temperature between 65 and 74 degrees F.

ATTACHMENT 16000-A.6

REVISIONS				
ZONE	REV.	DESCRIPTION	APVD.	DATE
		Initial Release		04/03/02





Part # FC-TEL-01

Attachment 16000-B

Note 1: Ground bars are made from silver plated C110 electrolytic tough pitch copper, conforming to ASTM B133, and B187. Electrical conductivity is 101% IACS.

Note 2: Holes to accomodate 2 hole compression lug for #6 wire. Typical lug - Ilsco #CRB-6L2.

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES; TOLERANCES:
FRACTIONS ±.030 DECIMALS .XX ± .020" .XXX ± .010" ANGLES ±0° 30'
DIMENSIONAL LIMITS APPLY BEFORE FINAL FINISH.

MATERIAL: See Note 1

FINISH:

DFTG.:	DATE:	04/03/02
CHKR.:	DATE:	
MECH. ENG.:	DATE:	
ELEC. ENG.:	DATE:	
PROJ. ENG.:	DATE:	

N.J. SULLIVAN CO.
INCORPORATED
P.O. BOX 438, STERLING, VIRGINIA 20167
METAL FABRICATION
Phone: (703)-471-0544 Fax: (703)-471-0275

DWG. TITLE: Ground Bar Submittal
Fairfax County

DWG. NO.: 10050 REV.:

SCALE: None SHEET 1 OF 1